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CONTRACTING • AIR CONDITIONING

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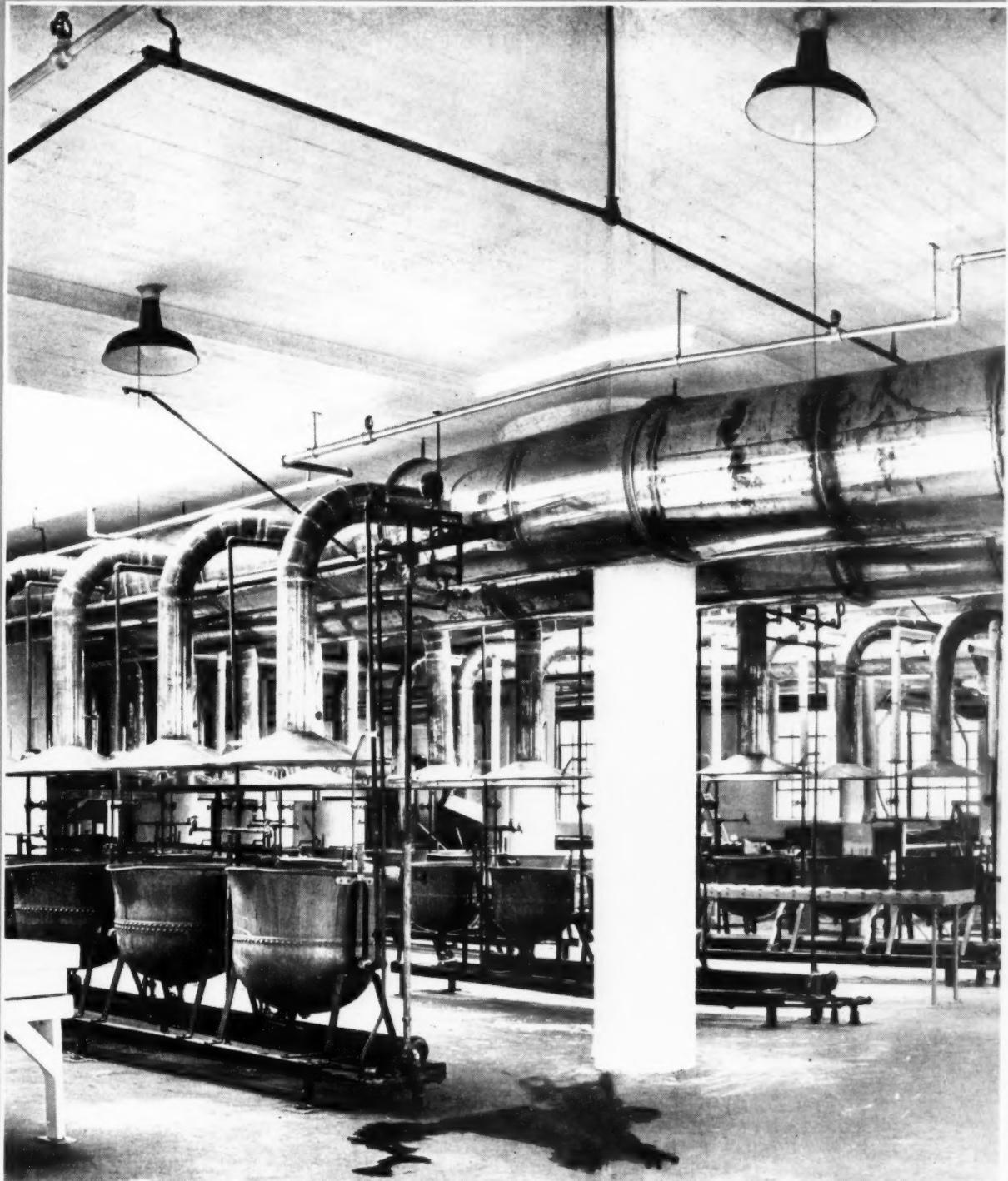
FURNACES
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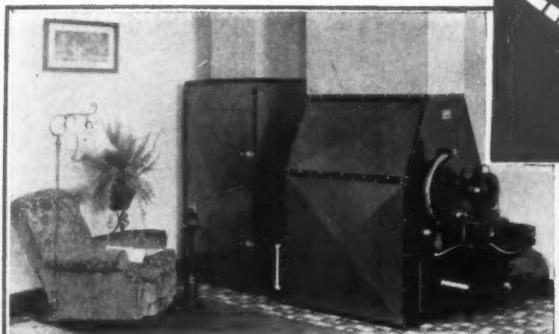
AND

arm-Air
heating



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1933





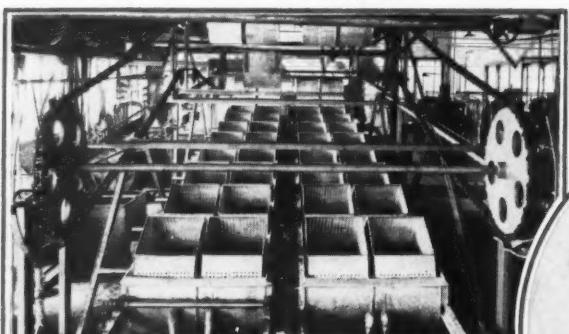
Wood Hydraulic Hoist & Body Co., Detroit, Mich., uses Toncan Iron for rust resistance in this Tempered-Aire Unit.



Toncan Iron water pans are used in this banana ripening room.
Photo by courtesy of Consolidated Gas & Electric Co.,
Baltimore, Md.



Toncan Iron aids the fight against tuberculosis in these guinea pig cages made by Baltimore Stainless Steel Co. for U. S. Dept. of Agriculture.



The Progressive Laundry Machine, made by Bellingham Iron Works, Bellingham, Wash., uses Toncan Iron for washer trays and tubs—to resist rust.

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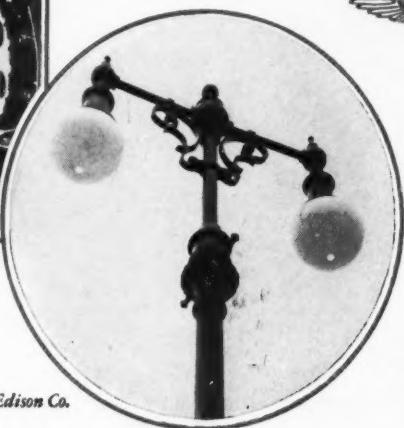
You can safely use Toncan Iron, and in fact you should use Toncan Iron, wherever moisture introduces the element of corrosion. Only five examples are illustrated here, and they range from guinea pig cages to lamp posts, but in every industry suitable applications where a rust-resisting metal is necessary are legion.

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In building construction and replacement work, in rust-resisting equipment for industrial plants, in heating and air conditioning equipment—wherever rust shortens the life of metal, sheet metal contractors can profitably use Toncan Iron—the metal that asks no favors. Send for "The Path to Permanence."

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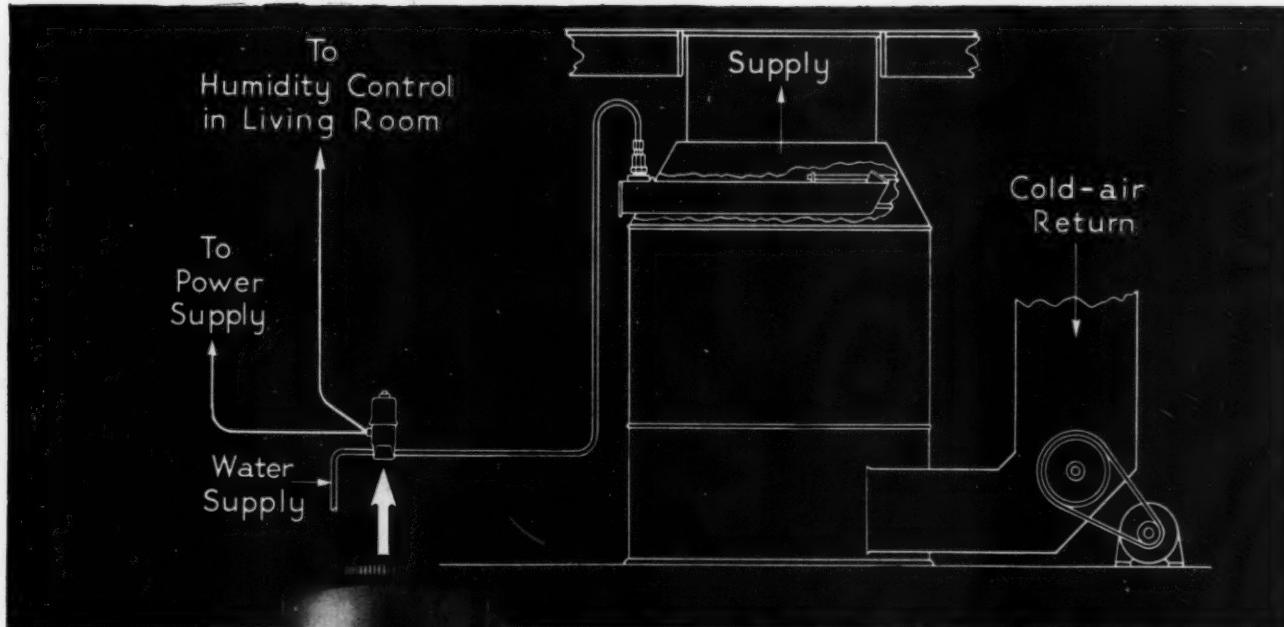


Lamp posts and brackets erected by Brooklyn Edison Co. at Coney Island are of Toncan Iron.

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AMERICAN ARTISAN

With which is merged

FURNACES
AND
SHEET METALS

Warm-Air
Heating

Vol. 102, No. 11 November, 1933 Founded 1880

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More than 7,000 copies of this issue are being distributed.

True Talks

with successful sheet metal men

SERIES No. 3

NUMBER 6



TIME CLOCKS RING BUSILY IN SHOPS PUSHING MONEL METAL

New Equipment Now Going Into All Kinds of Factories Brings Sales and Profits to Sheet Metal Shops

Over 2,000,000 workers have gone back on the job under NRA!

Furnaces are blazing again. Wheels are turning. Chimneys are smoking.

New tools, new equipment are needed for these 2,000,000 to work with!

And right here is where the live-wire sheet metal shops are step-



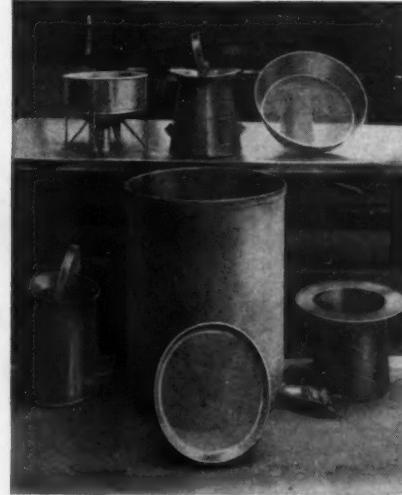
Jacketed all Monel Metal dipping tank for use in chemical plant. Fabricated by L. O. Koven & Bro., Jersey City, N. J.

ping in... stepping in and getting fat orders...getting their share of new business.

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And it works! Look at the jobs shown on this page. Textile, chemical, paint, canning plants—these are only just a few.



Accessories made of Monel Metal by the Cutter Sheet Metal Mfg. Co., Cleveland, Ohio, which are used in the paint manufacturing industry.

ditions and the materials they handle call for equipment that is rust-proof, corrosion-resisting, steel-strong, enduring?"

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Lobster Packing Equipment that represents another profitable field for the Sheet Metal shop.

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*... to gain yardage
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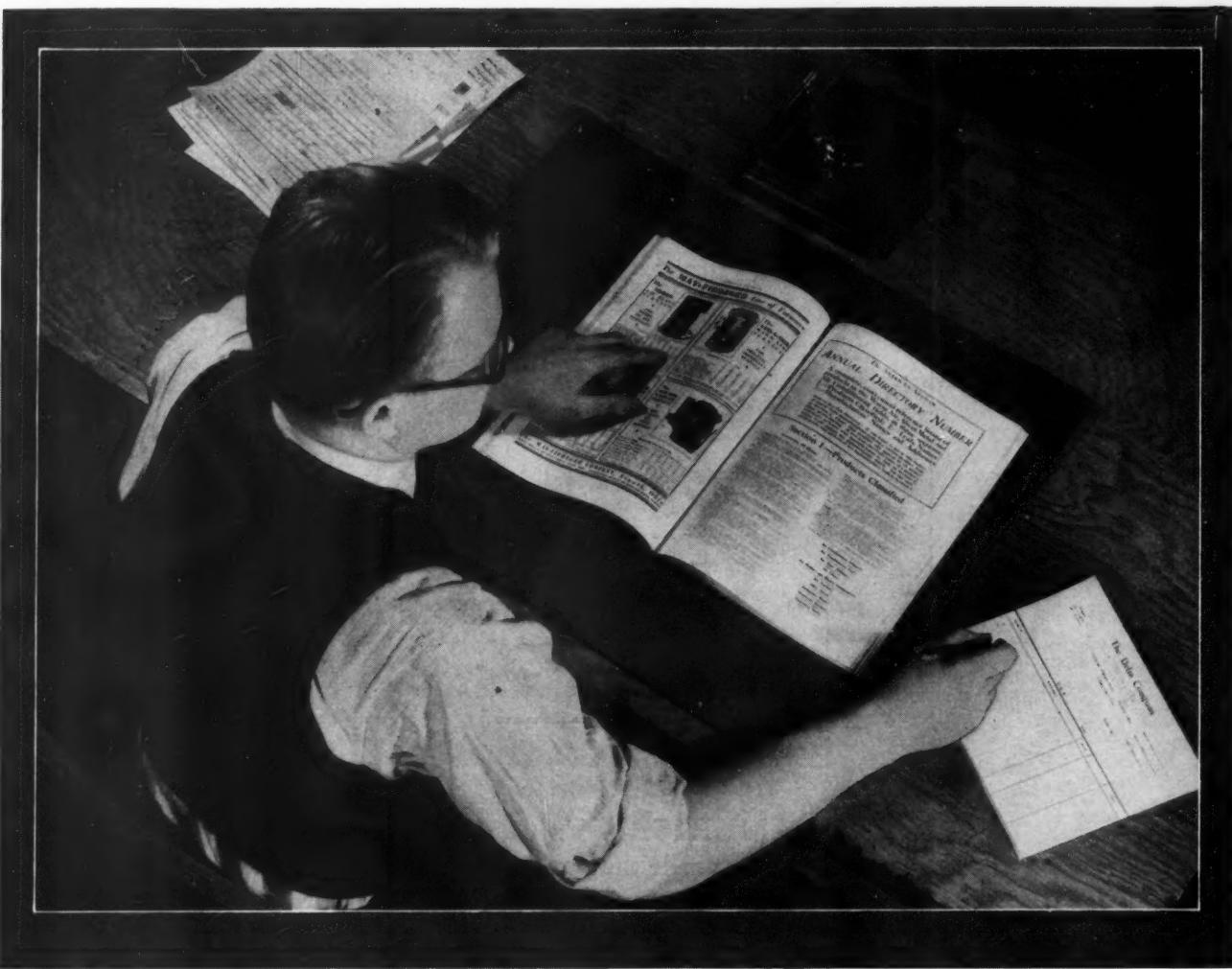
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BECAUSE it provides them with a complete, convenient guide to "Where to Buy," information which they can secure from no other single source, buyers in the warm air heating and sheet metal industry refer constantly and confidently, throughout the year, to the Annual Directory Number of American Artisan. • Although first distributed less than

a year ago, the Annual Directory Number has become an established fixture among these important buyers. Never before has a reference book of this nature been compiled to serve this vast field and the men in the industry have been quick to appreciate its value. • The Classified Directory will prove of inestimable value to buyers. To aid these men, and ultimately the manufacturer, this directory has been compiled to include a complete, correct, up-to-the-minute list of products of all manufacturers in the warm air heating and sheet metal field. To facilitate their use of this directory these lists are classified, indexed and cross-indexed. • To further facilitate the buyer's use of this directory, manufacturers whose names appear in this directory are listed alphabetically along with their latest, complete addresses. When the buyer is in need of the manufacturer's name and address, these are immediately accessible to him. • Another service never before available is embodied in the Trade Names section. The buyer who is acquainted with the trade name, only, of some equipment or material and who would otherwise be at a loss to locate the name of the manufacturer, may, by consulting with complete, alphabetically arranged list of trade names readily glean this information. • This issue will contain valuable technical data which will enter into the every-day business transactions of men in the industry. It will prove of such value to

In Constant Use BY THE Buyers

OF THE INDUSTRY

them that they will find frequent occasion during the year to refer to it. • Always at their fingertips, where its buying and technical information is readily available, all through the year, frequent consultations of this issue by the buyers of the industry are inevitable. Manufacturers, whose buying information appears on the advertising pages of

this medium, could choose a means no more practical, far-reaching or economical for displaying their line or their service; practical and far-reaching because its coverage is complete, because it reaches the *important* buyers in the industry; economical because it affords the advertiser twelve months' representation, right on the buyers' desks, at extremely low cost. In it your message can not fail to get their attention. • Because of the nature of the Annual Directory Number, because it is a reference book, it is suggested that advertisers use copy in this issue which will give buyers *complete buying information* on their line or their service. When your advertisement appears, in effect, as a catalog, it may be referred to in the same manner and as frequently as is the directory material. Buyers *need* this information and they welcome it when it appears in this one large reference book which they may keep before them at all times. This advertising is low in cost, and it *pays dividends throughout the entire year*. • To aid in the preparation of this type of advertising, our staff is at your service. They will be pleased to submit, for your approval, a presentation of your line or your service for use in this issue. No obligation. Send literature now and at an early date a suggested advertisement will be mailed to you. *Advertising rates furnished gladly upon request.* AMERICAN ARTISAN, 1900 Prairie Avenue, Chicago, Illinois.

"GOOD TIMES or BAD WE BACK YOU TO THE LIMIT"

says H.T. Richardson



A message from the Vice-President of the Richardson & Boynton Co., who devotes much of his time to the various merchandising problems of warm-air heating contractors with one thought in mind: **MORE PROFIT FOR THE DEALER.**

THINGS look pretty good! Down here at R. & B. we're more optimistic than we've been in a long time. Here's hoping that the big comeback is on the way. *But remember this:* good times or bad, we're with you just the same—hard going or easy, Richardson & Boynton will back you to the limit!

"And when we say 'back you'—we mean it! Not with a lot of promises but with *real action* . . . the kind that brings home the bacon. The famous 'R. & B.' selling plan has helped hundreds of dealers—and it can help you. Here's the way it works: Our Talking Portfolio is the self-starter—gets the prospect interested,

quickly. The product—the Richardson 'Perfect' Warm Air Heater—speaks for itself. An intelligent sales talk by you—and the trick is done.

"Best of all, when the installation is made, your job is over. No worries about money or collections. The Richardson Time Payment Plan takes care of that. We pay you *immediately* . . . the customer pays us in installments. That's cooperation where it counts!

"Let's get together. Drop us a line and we'll send you complete information. There's no obligation . . . you can't lose!"



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Our Opportunity Under The NRA

AS President Roosevelt said over the radio October 22, the whole industrial recovery plan has now been in operation long enough so that most of us can begin to draw conclusions and formulate definite ideas on how we fit into the picture.

This whole program is like a major battle. The battle line is composed of divisions, each division accountable for progress along its front, but all divisions cooperating in the general battle plan.

Our industries—warm air heating, air conditioning, sheet metal, ventilating, roofing—are actually only one part of one division. Our division is the construction industry and our regiments are working with regiments of plumbers, masons, carpenters, electricians, road builders, architects, general contractors and many others.

Sometimes we forget our part in the picture and chafe at restraint; we come to feel that we are not receiving the attention due as major units in the battle; our leaders become confused at the mass of orders and counter orders and transmit this confusion of mind to us—the privates and non-coms.

It is natural that the confusion of the battle leads to a confusion of mind and thought. Individuals become obsessed with one idea and this blots out the fundamental tactics. Local and state associations become involved in local problems and cannot see why these local problems are not considered the major problems of the whole construction industry. Even the national associations become touchy on work allotment and view with alarm all moves and claims of other branches of the field.

The details of the battle are, of course, intricate in the extreme. And because we are not in an actual army but are individuals of some importance in our community, we naturally feel that we are not being considered in making up the orders for the day. We fail to appreciate how trivial are our local problems as compared with the basic plans of battle and do not appreciate that the winning of the major objectives will automatically solve our local problems.

This confusion is indicated by the dozens and dozens of letters reaching us every week. Out of these numerous letters only an occasional one indicates that the writer has a true perspective of the program and is working with the real facts in mind.

One such letter comes from B. F. John of Philadelphia, long identified with the field and for many years active in association work. Mr. John writes:

"There seems to be some hard feelings developing between crafts. Personally, I think there is no need for any section of the trade getting stiff-necked about the matter, no matter how Washington decides, for it will be much better for all of us to go along until the general code is approved.

It is not sensible to figure that this general code will be of much local interest because wages, hours, working conditions are local problems and will be settled as such. Furthermore, I don't believe Washington will care particularly how these problems are settled locally so long as the basic minimum provisions of the general code are complied with.

"The important thing, it seems to me, is the psychological effect upon the public mind to increase business. The more bickering and stubbornness, the less will be the general benefit.

"No one here or elsewhere will or should care whether Chicago or New York pay \$2.50 per hour and work 15 hours per week or use any other schedule. After the general code is approved, it will be up to every employer or local association to make the best terms possible according to the conditions in that locality. If these terms are out of proportion and make for too great a rise in sales price, anyone can see that jobs won't be let.

"Some employers argue that rulings so far have all been in favor of the unions and that union officials are taking advantage of the Government because of the clause relating to labor. These employers fail to realize that all these problems are strengthening local associations and that strong local associations can take care of such local problems much more satisfactorily than can one individual. Ninety per cent of the trade never paid union wages and never will.

"There undoubtedly will be many conditions which codes and organization work will correct. Among them are: A decent wage for all employees (the public pays it). If wages are at least equal to the minimum ruling, wages in general will be higher than heretofore and the price cutter will have to raise his sales price. Forty hours per week. A chance to stop rebates, unearned discounts, commissions which show favoritism or graft. Peddling of bids will be stopped. Every contractor becomes a policeman working for better conditions. The installation of books and book-keeping systems that will show a man what it is costing him to do business.

"The two major local problems seem to be: How much shall we pay and how long shall we work?

"Whenever these two problems are settled and policing becomes effective we ought to see even the 'hard-boiled' shops working with the association because organization will give them a real chance to make a profit and get a decent price for their work."

We feel there is much food for thought in the above statements. The remarks cut through the persiflage which has been thrown, meaningly or unintentionally, around the whole proposition and bring out into the open the real problems which the industry and the individual must face.

What do you think?

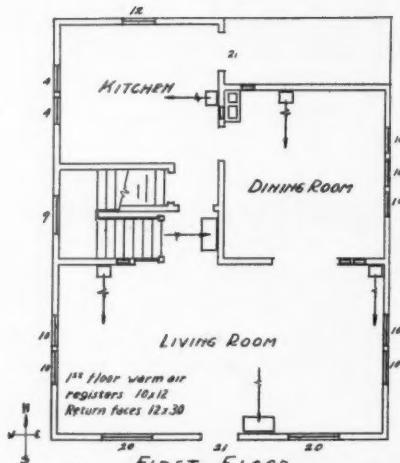
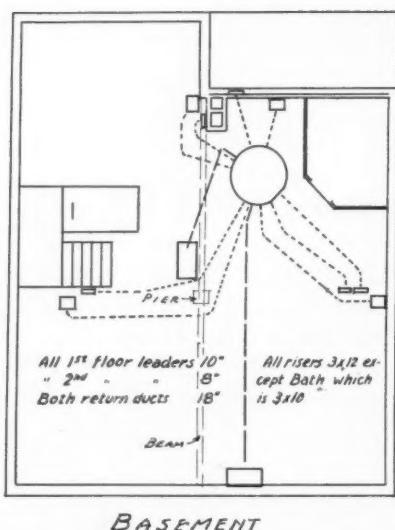
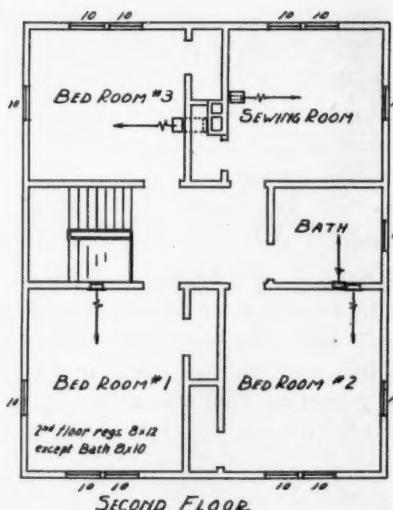


Fig. I



Last month we set out the rules for determining register air temperature and velocities. This article gives some short cut charts and the basic rule for remodeling which is that—

Most Exposed Second Floor Room Determines Temperature and Velocity

THREE facts brought out in the first article in this series appearing in the October issue, are worth repeating:

1. Every heating contractor should adopt some definite standard of register temperature and duct velocity as a basis for his design of mechanical heating systems.

2. It should be recognized that such a standard is established for convenience and that one not only may, but should, deviate from that standard whenever there is a valid reason for such deviation.

3. Whatever combination of register temperature and velocity may be chosen as the standard, the heating contractor with even limited experience in mechanical heating, may safely design plants for register temperatures up to 150 degrees (with coal fired furnaces) and air velocities up to 550 f.p.m. in wall stacks and branches from main trunk lines.

Fact 3 should not be taken to mean that whenever we find that our "standard" of temperature

and velocity, whatever it may be, would require more wall stack area than is available in a remodel job, we should necessarily jump to the allowable maximum of 150 degrees and 550 f.p.m. It is desirable to hold as closely as convenient to our standard design basis. The question then becomes, "HOW can we determine what basis to use?"

Since second floor rooms use smaller duct areas in gravity heating than first floor rooms to supply a given quantity of heat, we should let the second floor room with the greatest heat loss guide us in determining the particular combination of register temperature and duct velocity to use in redesigning the plant for mechanical circulation.

Take as a typical example the Sewing Room shown in the plan (Figure 1, October issue) with a heat loss of 9,780 B.t.u. per hour and an available riser 3 by 12 inches. The cross sectional area of the riser is 36 square inches, and to offset the heat loss of 9,780

B.t.u. per hour, each square inch of the riser area must deliver $9,780 \div 36 = 272$ B.t.u. per hour.

Following are a few combinations from Table No. 2 (October issue), any one of which will supply about 272 B.t.u. per hour per square inch of duct area:

Reg. temp.	f.p.m.	B.t.u. per Sq. In. per Hour
135	600	274
140	575	278
145	550	282
150	500	270

Table 2 is based on the assumption that the average temperature of air in a supply duct will be 15 degrees higher than the register temperature. This is only an approximation applying to warm air ducts in general and represents only an assumed average condition. For high register temperatures and long runs the difference might be somewhat greater; for short runs and low temperatures it will be very much less.

The difference will also be affected by the type of the duct (especially its outer surface), the temperature and motion of basement air surrounding the duct, etc. The table is intended to give very conservative values under average conditions. As we are applying it here to wall stacks, it contains a more than ample safety factor because the average air temperature in a riser supplying a second floor room will not be 15 degrees higher than the register air temperature—a 5-degree difference would be more nearly correct.

For the benefit of those readers who hesitate to apply any data without verifying its correctness, an explanation has been prepared and will be mailed to any reader. This explanation gives full explanation of the formulas used. If interested, write us.—The Editor.

The chart (Figure 2) provides a convenient means for seeing at a glance what combinations of register temperature and velocity will deliver a given quantity of heat in terms of B.t.u. per square inch of duct area per hour. Suppose, for example, we have a sec-

ond floor room to be heated by a 3x10-inch riser, the heat loss of the room being 7,500 B.t.u. per hour. The riser area is 30 square inches and each square inch must therefore deliver $7,500 \div 30 = 250$ B.t.u. per hour. Entering the chart at the left margin and following the 250 line horizontally to the right we find that it intersects the vertical line representing a register temperature of 130 degrees at a point about midway between the diagonal lines corresponding to 575 and 600 f.p.m. It intersects the 135-degree line at the diagonal representing 550 f.p.m., etc.

This chart applies to warm air supply ducts in general. Since most wall stacks are 3x10- or 3x12-inch, two additional charts (Figures 3 and 4) are provided which may be kept for ready reference and which will give the total heat delivery for each riser at various temperature and velocity combinations. With these riser charts, it is not necessary to first determine the B.t.u. that must be delivered per square inch of area, but the B.t.u. requirement (or r.b.f.) of the room is used instead.

Taking the illustration just given, a room having a heat loss of 7,500 B.t.u. per hour with a 3x10-inch riser available. On the lower scale of the 3x10-inch riser chart (Figure 3) locate the heat requirement of the room, 7,500 B.t.u. ($r.b.f. = 7.5$) and projecting vertically upward we see again that a register temperature of 130 degrees requires a duct velocity between 575 and 600 f.p.m., etc.

If a 3x12 inch riser is available for a room having a heat loss of 10,400 B.t.u. per hour ($r.b.f. = 10.4$), we locate 10.4 on the bottom scale of Figure 4 and projecting vertically upward to the points of intersection of the various horizontal register temperature lines, we find that any of the following approximate combinations of temperature and velocity will take care of the room:

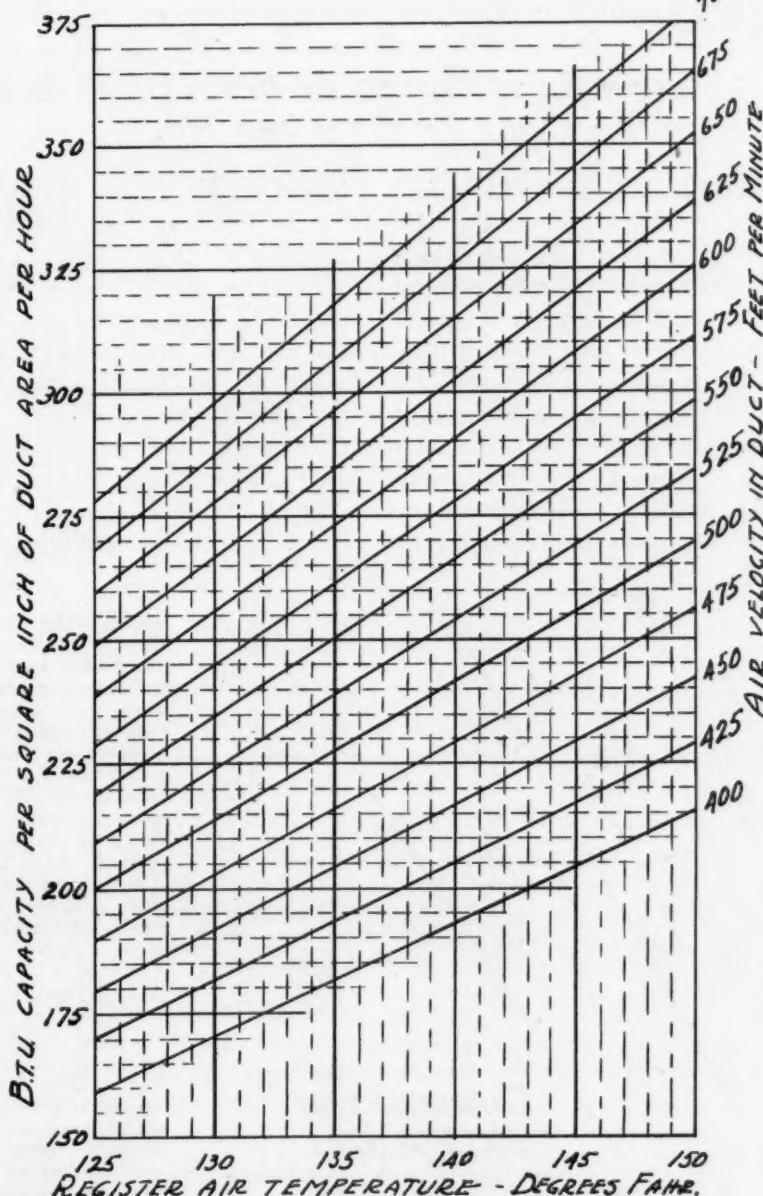


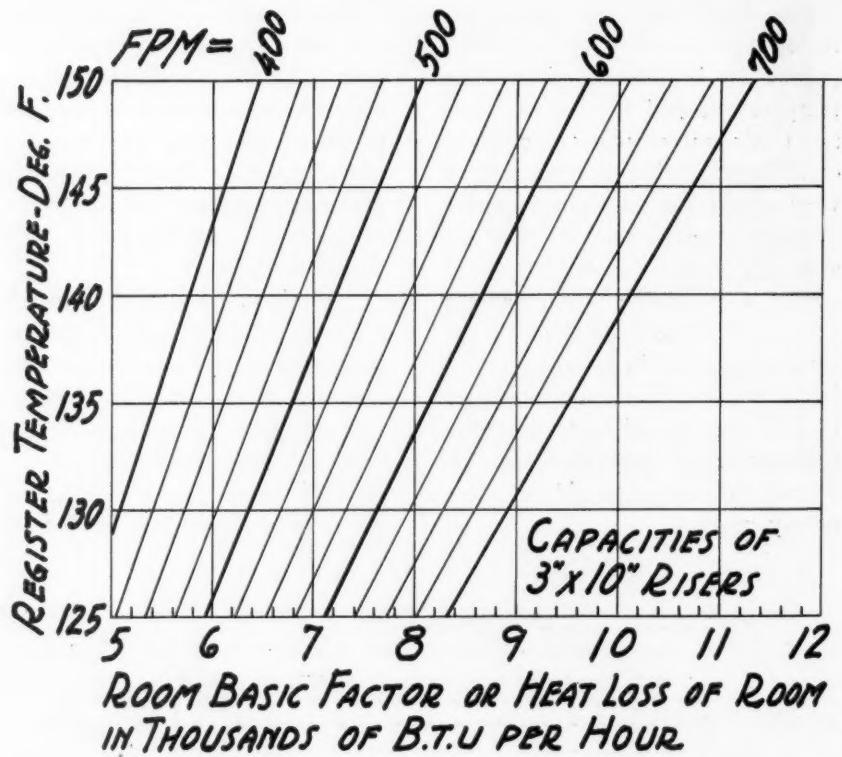
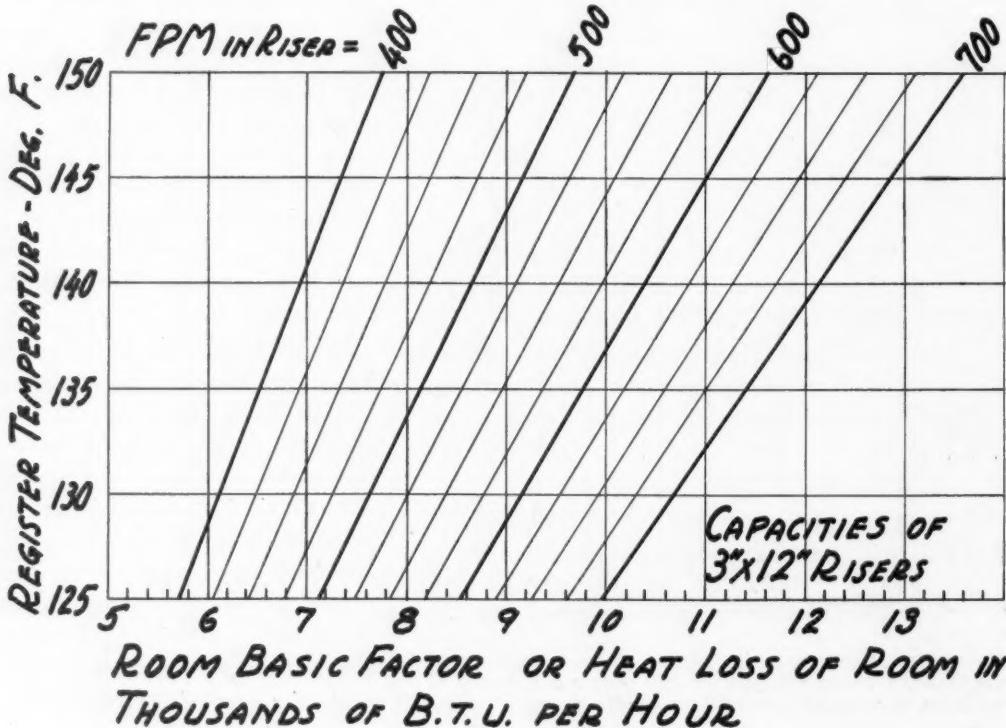
Fig. 2.—This chart provides a convenient means for getting the combinations of register air temperature and velocity which will deliver any required quantity of heat in terms of B.t.u. per square foot of duct per hour.

130 degrees and 675 f.p.m.
135 degrees and 650 f.p.m.
140 degrees and 600 f.p.m.
145 degrees and 575 f.p.m.
150 degrees and 550 f.p.m.

We have seen that the first step in converting an old gravity plant into a mechanical system is to determine the heat losses of the rooms. The second is to decide on the particular combination of register temperature and duct velocity to use for the job, basing that selection preferably on the temperature-velocity combination needed to take care of the room having the greatest heat loss per square inch of available duct area.

In the job we are here considering, we found that the Sewing Room has the greatest heat requirement per square inch of stack area and that (to keep within an arbitrary maximum register temperature of 150 degrees and a velocity of 550 f.p.m.) a mechanical system could be designed for the house on a basis of 145 degrees and 550 f.p.m. or 150 degrees and 500 f.p.m.

If 150 degrees and 500 f.p.m. is the combination chosen, the third step will be to determine the supply duct area required for each room on this basis.



According to the Mechanical Code, Second Edition, the volume of warm air delivered to a room at a register temperature of 150 degrees, is equal to the room basic factor (r.b.f.) multiplied by 10.9; for a register temperature of 150 degrees and a velocity of 500 f.p.m. in the duct, the duct area is equal to the r.b.f. multiplied by 3.5. To determine the sizes of warm air registers, we

follow the Code requirement that the net free area shall be not less than $6 \times \text{r.b.f.}$

In Table No. 3 Column I gives the r.b.f.; Column II, the c.f.m.; Column III, the required duct area; Column IV, the corresponding diameter of round pipe, and Column V, the minimum free area of supply register.

It will be noted that according to our previous calculations, 36

square inches of duct area were needed to warm the Sewing Room with a register temperature of 150 degrees and an air velocity of 500 f.p.m. in the duct, yet Table No. 3 shows only 33 square inches. This difference is due to the following three causes:

1. The Code rule says that, for 150 degrees at the register and 500 f.p.m. in the duct, the required duct area will be $r.b.f. \times 3.5$, which is a reasonably close approximation. A more precise factor would be 3.54 instead of 3.5, and the duct area would then be (for the Sewing Room) $9.78 \times 3.54 = 34.6$ sq. ins. This accounts for part of the difference.

2. The Code assumes that the air in the supply ducts has a volume 13% greater than 70-degree air, which is actually true only at 135 degrees.

3. Our calculations are based on the assumption that the air in the supply ducts has a temperature 15 degrees higher than at the register.

Conditions 1 and 2 tend to make the ducts undersize for this, or any, job where 150 degrees is the register temperature. Condition 3 tends to make the supply ducts oversize, because in any small job like the one here considered the heat loss from the ducts is not great enough to make the average duct temperature 15 degrees higher than the register temperature—especially in any case where the particular section of the duct concerned happens to be a riser in which the air temperature will be almost the same as at the register.

Conditions 1 and 2 should not be construed as a criticism of the Mechanical Heating Code. Like its predecessor, the Standard (Gravity) Code, its purpose is to provide a series of rules to guide the heating contractor in making installation of mechanical systems in residences of average size and type without having to make direct application of engineering formulas which are sometimes confusing. It is assumed here, however, that the reader will be

interested, for purely practical reasons, in going beyond the mere application of Code rules and will want to understand how and why these rules apply to a given set of conditions.

The Mechanical Heating Code is sometimes referred to as "simplified engineering," but it is quite wrong to say or to think that one is "engineering a job" unless and until he understands at least enough of the basic principles embodied in the Code rules so that he can intelligently and correctly modify those rules to

pipes. Usually they are unsightly, and for the sake of future sales, if for no other reason, we should try to make our mechanical system look well. Frequently they take up valuable space in the basement that could be saved by the use of smaller ducts. Although the addition of a fan or blower of adequate capacity drives the heat up into the rooms and reduces the loss of heat in the basement by speeding up the circulation, this basement loss can be still further reduced by replacing the original gravity

TABLE NO. 3

Room	I	II	III	IV	V
	Room Basic Factor	C. F. M. Measured at Room Temp. of 70 Degrees	Duct Area Sq. Ins.	Round Pipe No. 1 in. S.	Register No. Sq. Ins.
Living	22.21	242	78	2 7.0	2 67
Dining	9.69	106	34	1 6.0	1 58
Kitchen	11.85	129	41	1 7.3	1 71
Bed #1	8.24	90	29	1 6.1	1 50
Bed #2	8.24	90	29	1 6.1	1 50
Bed #3	8.66	94	30	1 6.2	1 52
Sewing	9.78	107	33	1 6.5	1 59
Bath	3.96	43	14	1 4.2	1 24

Table 3 shown here gives in chart form all the information for the house we are working in. This is not a data sheet, but rather a working plan for the supply system. The use of the table is explained in full in the text of this article.

meet specific situations not included in the "average conditions" for which any general and simplified set of code rules of any nature must necessarily be written.

Having determined the warm air duct areas, corresponding pipe sizes and supply registers required according to the basis chosen for designing the job, our next step is to compare these with the existing pipes and registers, if we expect to use the old material. Since all first floor leaders are 10-inch and all second floor leaders 8-inch on the original gravity job, they are ample in size for the proposed revamped system. The old supply registers also can be used.

It is not best to use the old

piping with new ducts sized for mechanical heating.

For instance, the Living Room (Figure 1) used two 10-inch pipes to heat by gravity and their total surface area amounted to about 78.5 square feet, whereas a mechanical system could heat the room with two 7-inch pipes having a total surface area of 55 square feet. For this room alone the original piping has 43% greater surface area for wasting heat in the basement. It's true, as pointed out so often by members of the Research Staff at the University of Illinois, that heat given off in the basement is *vagrant* heat rather than *lost* heat. We'll get this heat eventually, but we don't want it eventually—we want it right now.



Weatherproofing An Indiana Memorial

ON February 25, 1779, George Rogers Clark captured Fort Sackville near Vincennes, Indiana. On September 3, 1933, just 150 years after the treaty of Paris which ended that war, a memorial was dedicated to George Rogers Clark at Vincennes. It was erected at a cost of \$1,500,000 by a national appropriation plus state and county funds. The

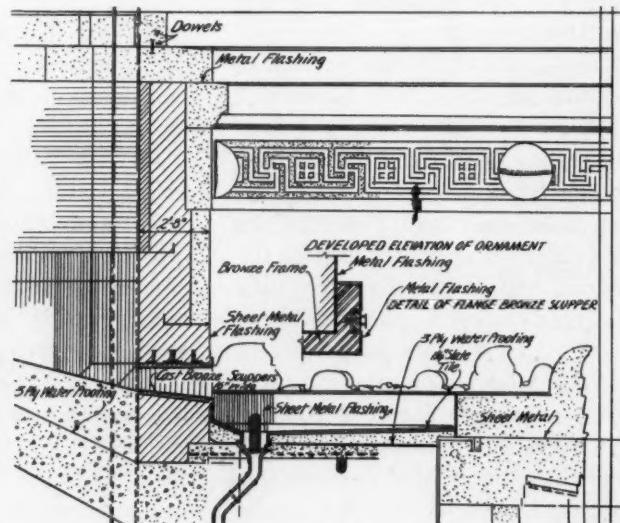
memorial stands on the site of old Fort Sackville.

In the construction of the memorial the sheet metal and roofing trades have played an important role for upon our industries has fallen the job of protecting the structure from the ravages of weather.

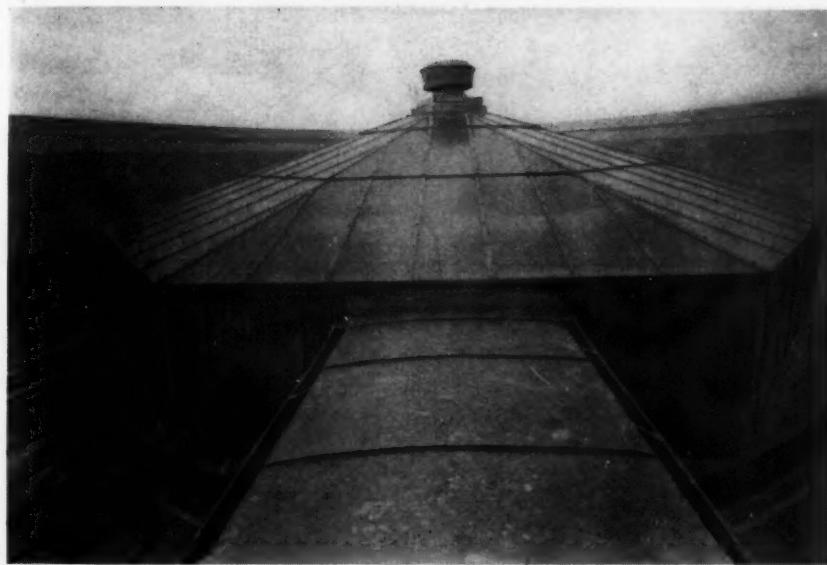
The contract let to the Hartmann Company of Terre Haute, Indiana,

includes the outside copper work, skylight, membrane waterproofing and all flashing—in short, complete weather-proofing.

Into the memorial the Hartmann company has put some 6,200 pounds of lead coated 16-ounce copper; 210 feet of 54-inch, 300 feet of 31-inch, 520 feet of 34-inch through wall flashing; and 350 squares of three-ply membrane waterproofing.



The photograph at the top of the page shows the exterior of the memorial. The photograph and drawing at the bottom show views and application of copper around the promenade, wall flashing, through wall flashing and some of the waterproofing for the memorial ceiling.

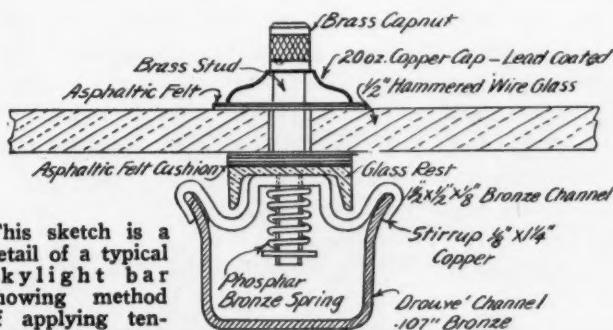


The large skylight is glass and copper. The base of the skylight and the roof of the well are sheathed in copper laid standing seam. Inside well wall flashing is also shown

Copper Work

The lead coated copper was used as wall flashing, copper covering on the shallow deck behind the

hind the parapet wall and is considerably smaller in diameter than the well proper. The space between the skylight base and the wall is



This sketch is a detail of a typical skylight bar showing method of applying tension to the glass

masonry cornice, copper siding around the base of the skylight, copper gutters and decks and the copper roof below the base of the skylight.

The memorial has a promenade behind the masonry cornice. Most of this promenade is covered with tile excepting a shallow deck which is carried from a point behind the cornice to a depth of about three and one-half feet, then down a step and under the tile.

The outside perimeter of the copper is caulked into a reglet in the stone. The top sheets are locked with standing seams and a double seam is used between top sheets and the face sheets of the step.

The skylight stands in a well be-

sheathed in copper with the sheets locked with standing seams.

This pitched roof is locked and soldered at the top to the round base of the skylight as shown in one of the photographs. The outside edge of the roof ends in a cir-

cular gutter lying around the bottom of the parapet wall. The lower portion of this wall is flashed with copper for a height of about five feet. This flashing is caulked into the brick work at the top and seamed and soldered to the gutter at the bottom.

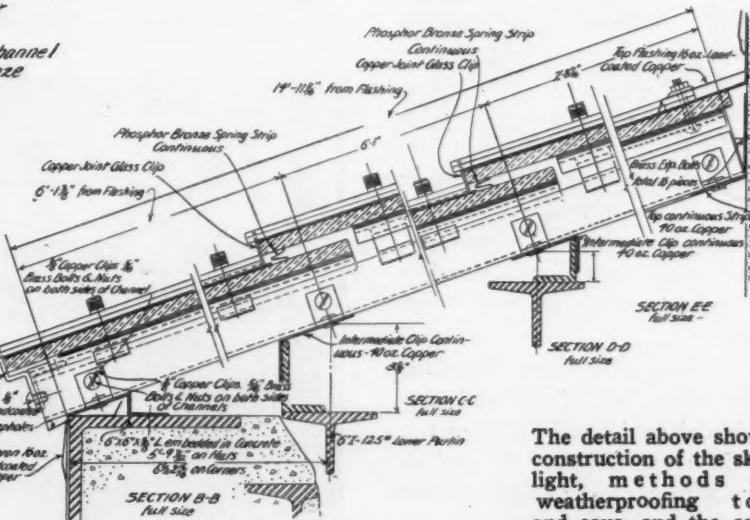
The sheets of the flashing are locked with standing seams and held to the wall with clips nailed into nailing strips.

The roof and gutters over the runway which leads to the door opening onto the promenade is covered with wide copper sheets locked standing seam across the roof. The gutter is hung along the eaves and is supported at intervals by copper strips soldered to the top of the roofing sheets.

The Skylight

The skylight has a diameter of just under 35 feet. The entire top is glass laid in three courses with each course raised slightly above the course below. The construction of the glass area is shown in one of the details.

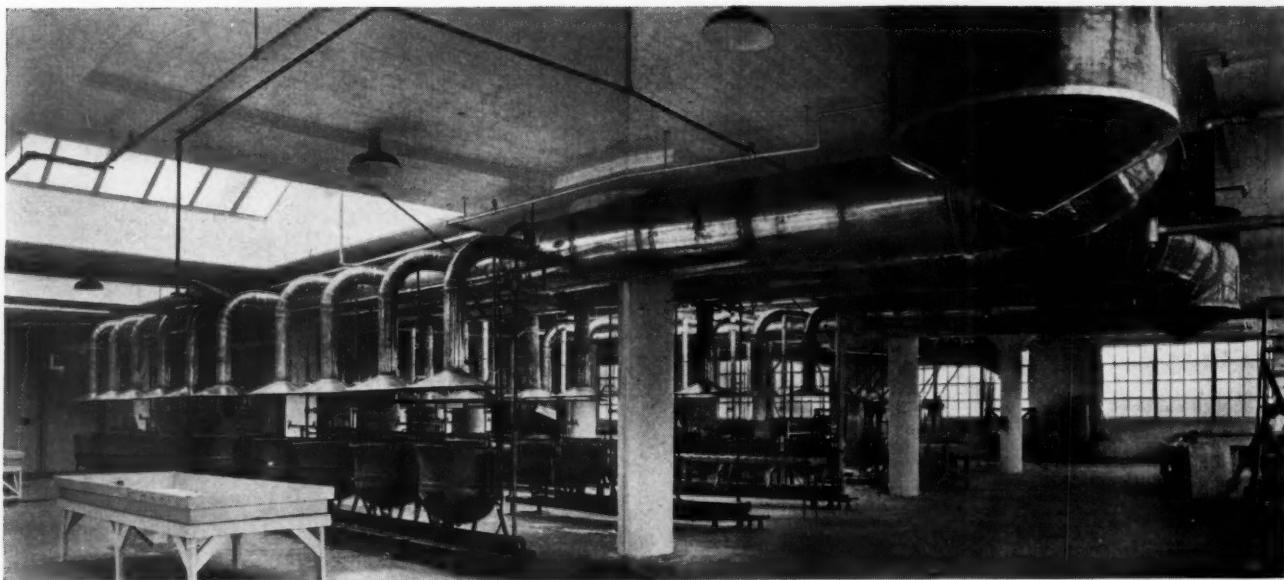
This skylight is a patented unit using special construction features.



The detail above shows construction of the skylight, methods of weatherproofing top and eave, and the connecting flashing

For example, the bars and hips are constructed with a bronze channel under the glass, a copper cap on top of the glass. A brass stud held tight with a spring holds the com-

(Continued on page 19)



Collecting System For Fumes and Condensate

IN the Seattle, Washington, plant of the Tea Garden Products Co. the interesting collecting system shown in the pictures was installed some time ago by the Western Blower Co., also of Seattle.

The system is installed to remove fumes and condensation from the cooking kettles to the outside of the building. The entire system is copper in 24, 26, and 32 ounce sheet. Even the fan housings are copper, using 40 and 48 ounce sheet.

The general plan of the system is an individual hood and branch for each kettle. These branches are tapped into the main which in turn empties into an expansion chamber. The top of the chamber is outdoors, above the roof, and is connected to the fan so that operation is "pull through."

Four fans are used, each handling 12,560 cubic feet of air, and each fan is driven by a 10 HP motor. The fans are built of 40 and 48 ounce copper, copper being specified on account of its long life and because it is sanitary. The exterior duct system was given a coat of aluminum paint to conform with the general scheme of the building.

In the first line of pots shown in the main picture there are ten 34-inch pots, with allowance in the main duct for four future pots in

the system. The main suction line is 8 inches from the first pot, graduated to a 32-inch diameter where it connects to a 54-inch expansion chamber. An inch and a quarter (1½") drain pipe carries off water from the bottom of this chamber. Nothing lighter than 24-ounce copper, nor heavier than 32-ounce, was used throughout this suction line. There is to be a future line of pots, with a main duct, to connect to

the opposite side of this chamber.

The chamber extends through the roof where a fan is connected to the side of the chamber, a future fan to be placed on the opposite side when the other pots are installed. The fan outlet has an automatic damper, which closes when the fan is not operating, this outlet and damper being made of 40 ounce copper.

The next two ducts handle con-

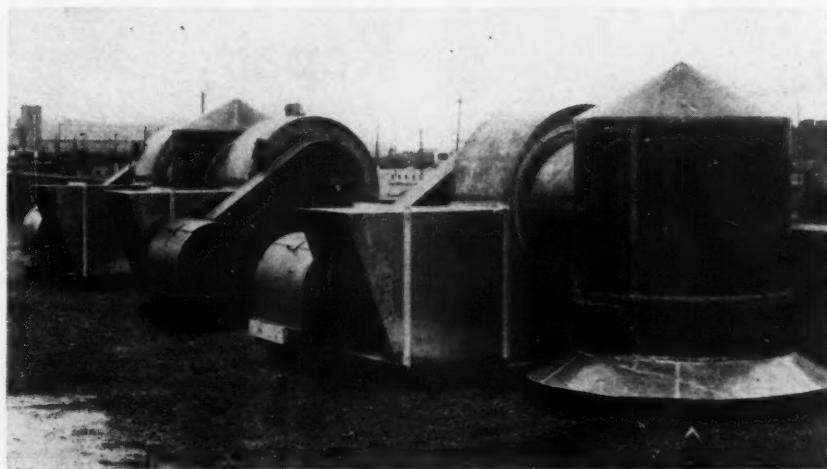


This view looking down two rows of kettles and the view above showing the complete system, show the hoods, branch pipes, main suction lines and expansion chambers. All metal is copper with joints riveted, locked and soldered.

densation from two lines of sixteen 27-inch pots, connecting to a common expansion chamber. There are two fans on the roof connected to this chamber. Each 8-inch branch pipe from the pots has a quadrant damper so that if only a few pots are operating on each line, one fan only is operated, the rest of the branches being closed off.

There is one other fan system not shown in the picture, for carrying off condensation from a 45-foot process tank, juice tank, etc.

There was approximately 10,000 pounds of copper used on this installation.

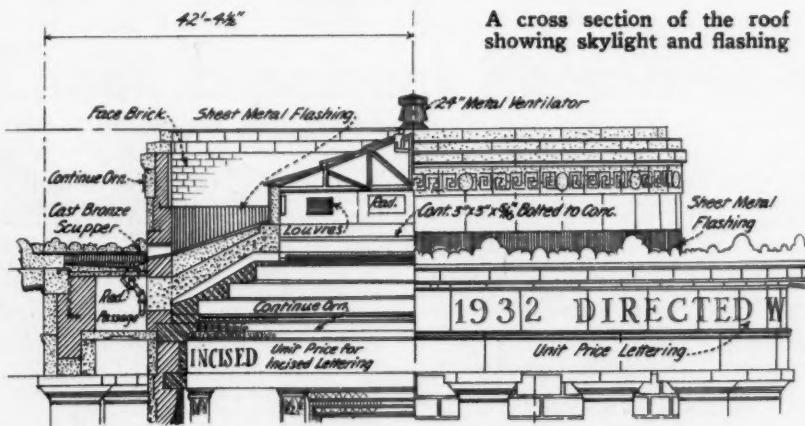


The expansion chambers extend through the roof where connection is made to the "pull through" blowers. The rectangular housing between fan and chamber contains the automatic damper which closes when the fan is idle.



Weatherproofing Indiana Memorial

(Continued from page 17)



plete bar together. The construction of this type of bar is shown in a detail.

The circular base of the skylight is sheathed in copper laid standing seam with the sheets clipped to the structural frame. Weather tightness between the glass light and the base is obtained by using a lead coated copper apron which is held in place around the top by a glass clip and by the spring of the copper over the flashing.

Wall Flashing

More than 1,000 feet of through wall flashing was employed in the walls to prevent moisture penetration. This large amount of flashing is placed in the structure as follows:

Under the next to the top course of masonry on the parapet wall and just above the masonry cornice a course of flashing is embedded and extends entirely through the wall.

Where the scuppers pass through this parapet wall another course of through wall flashing is used over the scupper frame.

Under the masonry cresting surrounding the outside of the promenade a course of flashing is carried completely through the stone work and turned down on the outside and inside.

The top of the base flashing around the outside of the parapet wall connects with a course of through wall flashing brought out

from the interior of the wall as shown on a detail and locked with the wall base flashing.

Waterproofing

One of the largest items on the Hartmann contract was the waterproofing. This is three-ply membrane type and was applied as follows:

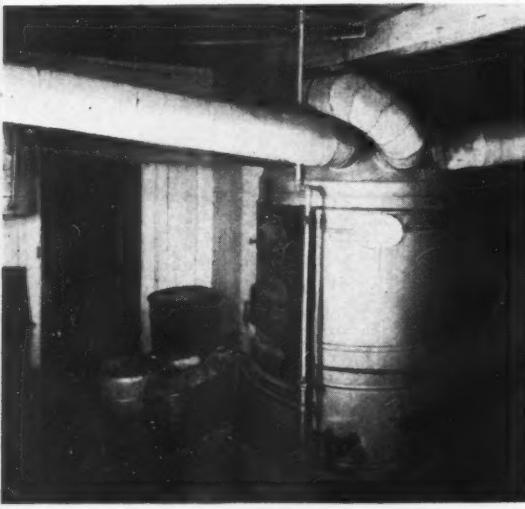
The concrete surface was primed with a concrete primer. Then 12-ounce asphalt saturated cotton waterproofing fabric was laid in three-ply construction with each ply mopped down in hot asphalt. Immediately after application the fabric was covered with a protecting coat of sand and cement concrete.

Waterproofing was applied on top of the concrete steps which form the foundation for the granite steps. This waterproofing course extends from the balustrade around the base back to the interior of the main building wall. The diameter of this waterproofed base is 182 feet.

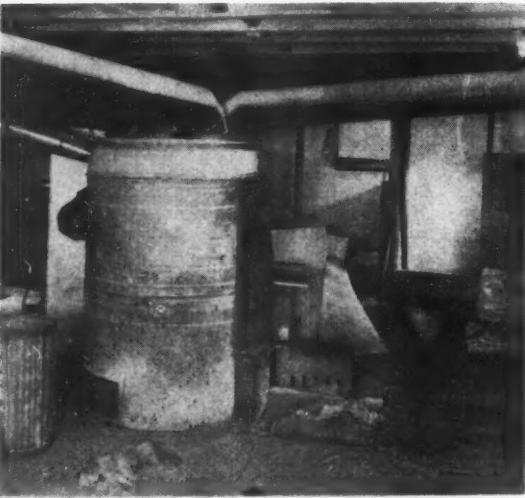
Waterproofing is also applied under the tile of the promenade and between two layers of concrete which form the roof around the skylight.



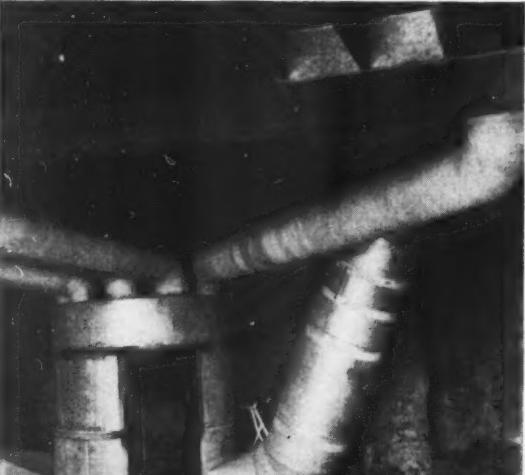
This may be a perfectly good heating plant; may operate efficiently; warm all the rooms—



and this gas conversion job may save the owner many steps and a lot of firing trouble;



The owner of this plant or the one below may think this is the usual basement, but—(see next page)



Repair, Replace, Remodel!

How About the Neglected Basements in Your City?

Check basement remodelling!

It's a new and sound selling idea, especially if your community is canvassed to death on low priced furnace cleaning, silk socks, toilet preparations, brushes or what have you.

What have we to sell for a basement remodeling job? Actually only a part of the work necessary if we stick to our trade and leave carpenter, electrical, plumbing, and other work to their trades or all the job if we act as general contractor.

We are the key trade. A prospect can't remodel his basement usually until we have done our part first. He can't make over the laundry for a play room, or the drying room for a recreation room if the furnace sits in the middle of the basement and the pipes make head whacking an everyday occurrence.

Let's look over a typical job. First, there's Mr. and Mrs. Average Homeowner — especially Mrs. Homeowner.

In these days most housewives are more than busy. They have taken upon their shoulders many duties which may formerly have been done by the maid, the cleaning woman, the laundress or laundry, and so on. Their days are filled with work and planning. If your community is average, the housewife's door bell and phone ring hour after hour. Some calls are welcome, but a great many are from someone who wants to sell a subscription to a magazine, some hosiery, a new soap powder, a kitchen gadget or any one of a thou-

sand other articles.

Answering such calls makes the housewife decidedly abrupt with most of these solicitors. To interest her the caller must present a NEW idea, something well worth the time necessary to consider the proposition, some idea which has real value to her and her family.

Mrs. Average Homeowner would you like to have a play room for the children these fall and winter days? A den for your husband? A retreat for you from the turmoil of the house? A place to have parties without thought for expensive furniture or your dainty furnishings?

Of course we want to know what selling arguments should be used to clinch the sale after the general idea has been implanted.

To get a true perspective let's look at an average basement. The millions of dollars invested in American basements has been aptly described as "buried treasure." It is estimated that over two billions of dollars are invested in home basements. This is in houses already built. In an average construction year like, say, 1926, basements cost some three hundred millions of dollars in new construction.

In recent years increasing costs of home building have brought architects and owners to the place where ceilings have been lowered, hallways have been eliminated, kitchens and dining rooms made smaller or completely left out, and built-in fixtures have replaced such rooms as pantries, closets and so on.

Despite all these economies, how-

CHECK SHEET			
Owner's Name Address Phone			
General Description Of House			
Make and Type Of Furnace	Age	Cond.	Size Required
Chimney Location	Condition	Draft	
Registers	Style	Condition	
Humidifier?	Type	What Results Does It Give?	
Filters?	Arrangement:	Condition	
Thermostat?	Location	Results?	
Controls?	Hookup	Results?	
Leads (Condition of)	Can They Be Used for F. A. Explains		
Stacks (Condition of)	Can They Be Used for F. A. Explains		
Furnace System (Description of) Is It Adequate?			
Are Any Rooms Cold? Remedies Suggested? Any Drafts?			
General Air Circulation Describe Poor Rooms			
What Changes Do You Suggest for Remodeling?	<p>Fix up basement for play room and den. Move furnace, new ducts, paint ceiling & walls.</p>		

Check Basement Remodeling!

ever, the basement seems to have sidestepped the axe and today's basement is much the same as it was twenty years ago. Of course new houses do use basement recreation rooms, dens, play rooms, but the number of houses having such an arrangement compared to the number of houses without these improvements leaves a field which will stand working for the next ten years.

According to some architect's findings the basement of an average small house represents a cost of at least 15 per cent of the total cost for the house. Thus a \$6,000 house has some \$900 invested in the basement.

There is ammunition enough in the last paragraph to interest any homeowner in any proposition which will increase the value of this investment or make such a valuable part of his house return some sort of a profit in pleasure, usefulness or improvement.

Selling basement improvement cannot, of course, be done with the same tactics used to get a \$2.50

cleaning order. We should remember that we are going to ask Mr. Homeowner to spend perhaps one hundred, or three hundred or five hundred dollars. There's a certain dignity to a sale of this size just as there is in the sale of a new automobile or an oil burner or any mechanical adjunct which costs money, but returns pleasure and profit.

Let's see now what changes we can make in the average heating system to make basement remodeling possible for the owner and profitable for ourselves.

If the furnace sits in the center of the basement the chances are we can suggest it be moved into one corner. Moving it into the corner may destroy the natural gravity balance to such an extent that a fan will be necessary. So we sell forced air.

To operate the fan to best advantage the fan ought to be controlled automatically and while we are controlling the fan we ought also control the fire so a control system is practically necessary.

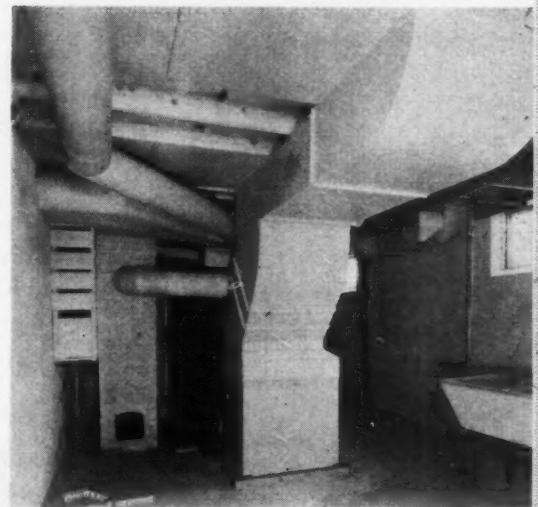
With the average basement hav-



How pleased must be this owner with his wood paneling, recreation room, hardwood floor—



or the owner of this basement with its fireplace, recirculated air, facilities for parties—



or the housewife with this cheery laundry or the jovial owner of the basement below.





There must be dozens of basements like the view to the left which can be remodeled with little expense into a play room for the children, where they can romp and yell or leave their toys.

ing about seven feet of clear head room round pipes of the old gravity system will usually be found objectionable, so some sort of a rectangular duct system or a combination duct and small pipe branch system will appeal to the owner. Either system will enable him to sheath the basement ceiling and hide the pipes and ducts between the joists. We can sell much or little in pipe work, depending upon the owner's willingness to spend money.

If our prospect is average it ought to be easy to interest him on the idea of painting the furnace and pipes, perhaps installing a new rectangular casing, painted and trimmed and baffled so that his fan will have correct air passages and the furnace the appearance of up-to-date equipment.

It goes without saying that Mrs. Homeowner will be interested in cleaning the air of the house—so filters. Filters make an interesting story—one every housewife will listen to and want.

Practically the same story can be told for humidification. Probably eight houses out of ten need more humidity. Some simple tests will show how much is needed and our recommendations can be met from a wide range of equipment. We can also point out the advantages and importance of insulation, storm sash, and so on.

If we fail to emphasize the comfort and convenience of mechanical heat we overlook the sale of a piece of equipment which carries an excellent profit and which adds much to the pleasure of this remodeled basement we are planning for the owner. Shall it be an oil burner, a gas conversion burner, a stoker or a new oil, gas or coal furnace? Let the owner express his choice, but once that choice has been mentioned a complete story of that piece of apparatus should be told at every opportunity.

It should be needless here to mention making a check on the troubles of the old system. Cold

rooms, underheated rooms, room areas where drafts prevail, sluggish circulation—these are problems of remodeling not directly a part of basement remodeling but as long as we are giving the owner an entirely new basement we can well afford to recommend the changes necessary to make upstairs more comfortable.

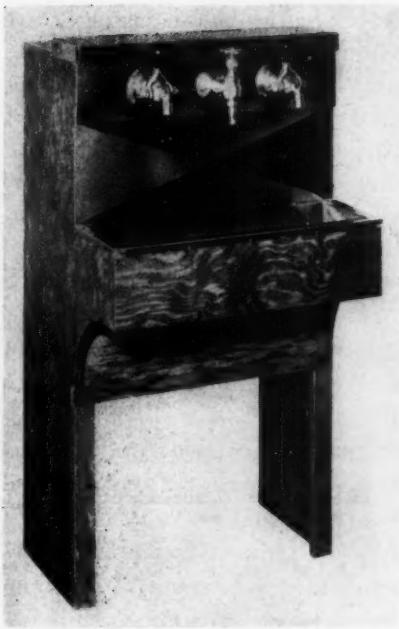
"But we won't find one owner in a thousand who will or can spend enough to do such a job!"

The answer is—"What if you don't?"

Once you interest Mr. Homeowner in fixing up his basement the chances are he will lead you from item to item, picking one here and eliminating another there as his interest or purse dictates. If you only sell a furnace moving job and a blower—that's something. Perhaps you can only paint the furnace and sell a set of controls or a humidifier, but even that is more of an order than you would get if you never interested your prospect in remodeling.



Even owners of automatic heating systems can take a note from the owner of this basement shown "before" and "after" where a little paint, some odd furniture, a partition or two makes "just another basement" a place to be proud of.



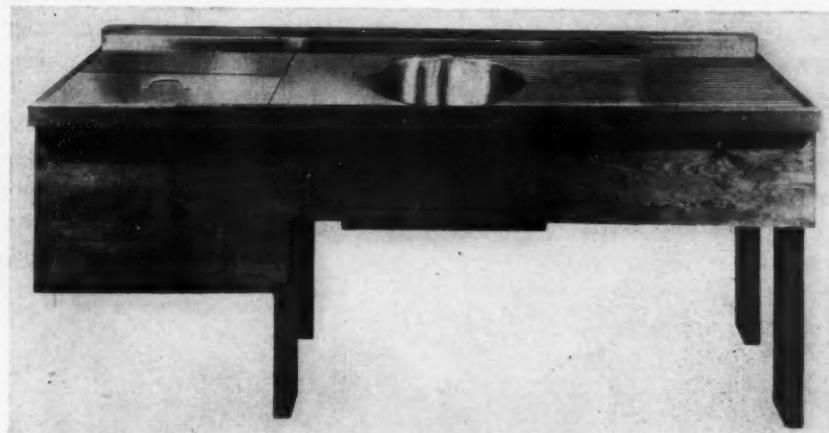
Wachter, Chicago, Plans National Distribution of Coolers, Workboards, Bars

By W. I. Brockson

work for half of them. We installed the bars in the Brevoort Hotel, the Insurance Exchange and other prominent buildings. In those days we had an average force of sixteen to twenty men.

"Naturally, when the eighteenth amendment went into operation it became necessary for us to forget beer and to concentrate our efforts

ing air leaks. Double pine insulated bottoms in cooler. 42 inches high, with 24-inch deep coil compartment. Available in 18, 24, 30 and 36-inch widths. Finished in walnut or oak stain. Lined with tinned copper. Brass strainer type overflow. Face of cooler and faucet board lined with polished copper. Top of cooler covered with perforated brass



Working surfaces of work tables are metal, mostly Monel, over solid wood frames. Rinse tanks are either copper or Monel and the tank is supported by a wood base. Above is a typical cooler.

upon general industrial sheet metal work.

"However, the return of beer this spring found us ready to 'sharpen up our tools' and bring into play all our past brewery experience on short notice."

The Wachter price list shows four principal classes of equipment: coolers, cooler frames, work boards and bars. The specification of the lines are contained in the price list. This reads:

Draft beer dispensing cabinets are masonite and air insulated. Exposed cabinet made of 5-ply fir panel, drip and side of one piece. Mortised solid panel back, prevent-

drainer plate and frame of heavy brass, either 6 or 12-inch to fit bar top.

All rigged coolers equipped with best grade key-seat faucets, 30 feet of block tin coils, mounted on galvanized cylinders, heavy brass connections. 10 feet of water coil and water faucet optional.

Draft equipment for coolers consists of the following:

1—Pressure gauge and regulator and for each beer faucet, the following:

- 10 ft. block tin from barrel
- 5 ft. beer hose
- 5 ft. air hose
- 1 peerless tap and barrel rod

NE of the smaller sized firms classed as successful beer equipment makers, in Chicago, is the Wachter Co. of 2621 Cottage Grove Ave. Since beer was legalized in the spring of 1933 this company has made in their own shop more than one hundred individual standard bar coolers, novelty boxes, work boards, service bars and related equipment. Although this has all been done in the short space of a few months with a force of employees never exceeding twelve men the company has found time to do other sheet metal work as well. And one of the most interesting things about the business is that after the first rush of the beer equipment demand had subsided, the Wachter Co. is in the midst of a sales campaign directed to those states which have been somewhat slow to adopt the general serving of beer.

For forty-five years the Wachter family has been in the sheet metal business in Chicago. In the days before prohibition they operated in two principal fields, first, general industrial sheet metal and, second, beer equipment. F. J. Wachter, manager of the present organization, says, "In the old days, we did the saloon service work for seven of the largest breweries in the city. There were about 7000 saloons here and at one time or another we did

November, 1933

Necessary hose clamps
One air distributor, where necessary.

The price list further shows that the coolers and work boards are available in copper, stainless steel or Monel metal.

OUR POLICY:

We have been serving the trade for over forty-five years and are still serving many of our original customers. Our slogan has been "*Buy from Wachter and be satisfied.*" Quality, workmanship and service assured on every order.

During the first few weeks of legalized beer most of the sales were made locally. However, it was realized that after the first rush of Chicago business was over there would still be a market, and a reasonably steady one, for many months for equipment in those states in which legal tangles had to be straightened out before beer could be generally sold. To reach this somewhat spotty national market an extensive sales campaign was launched in August.

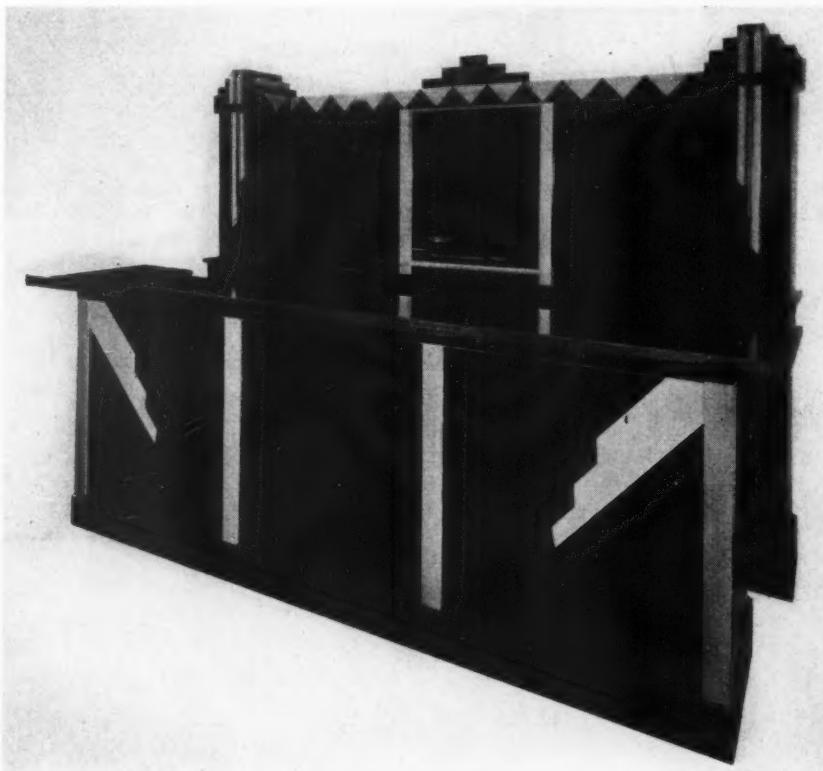
The first step was to secure ac-

curate information as to the legal situation in each state in the union. With this information at hand a map was drawn up and those states selected for the campaign were blocked off with special marks of identification.

Then, steps were taken to get high grade agents in all the selected states. Classified advertisements like the typical advertisement were inserted in the Sunday editions of thirty-one newspapers in principal

WANTED—Salesmen by company manufacturing beer drawing equipment. Sell direct or to jobbers. Liberal commission. Wachter & Co., 2621 Cottage Grove, Chicago.

cities, one city being chosen in each of thirty-one states from Idaho to Penna. This campaign was run during the last week in July and the first week in August. A total of two hundred and fifty replies were received to the advertising campaign and from these sixty salesmen were lined up to handle Wachter equipment, on a commission basis. All of the arrangements with these agents were made by mail, unsupported by personal interviews.



This ten-foot service bar and back bar is walnut or mahogany with metal trim or painted wood. The wood parts are made up for the Wachter company which adds the metal.

Naturally in consummating these arrangements it was necessary to send the prospective representatives photographs of the various types of equipment, descriptive pamphlets, discount sheets, and a full and thorough discussion of the policies of the house.

There are two general classes of representatives. The first is the dealer type who sells the equipment to the dispensary, restaurant or tavern. The second is the manufacturer's agent type who covers larger territory than the first and establishes and works with the first type. Of the sixty representatives established as a result of the campaign, twenty have produced a satisfactory volume so far, and six are very good. For example one man of the manufacturer's agent type in Texas and another in Virginia are each putting on twelve salesmen.

All of the work of handling the replies to the classified advertisements, answering individual questions coming in the second and subsequent letters from prospective agents, was handled in the Wachter office and a force of three people was kept busy for a time.

After definite arrangements were made with any agent, his name was placed in a card file of active agents and each man whose name appears in this file gets at least one letter from the house every week.

Mr. Wachter explains very frankly that he makes no effort to sell in competition with many of the cheap items of equipment that have been offered to the trade. At the very outset of serving legal beer in 1933 a great many "pikers" rushed into the dispensing end of the business. The majority had very little capital and none too good business judgment, and demanded cheap fixtures. Many of these have "fallen by the wayside" and in all probability the trend of demand in the future will be toward the higher quality equipment. The inquiries and orders coming to Wachter in the past month or two bear out that conviction.



W. A. Conkling

OF course, Mr. Contractor, you carry workmen's compensation insurance, but you are not getting full value from this necessary item of overhead expense if you are keeping it a secret.

This line "We carry workmen's compensation insurance for your protection" printed on invoices, letter heads, etc., will give you some good, free advertising. Then in your regular advertising copy carry the thought a little farther and in conversation with a prospective customer tell him how he is protected by this coverage.

Let your customer know that if he gives his work to some "curbstoner" who does not carry workmen's compensation insurance and that man meets with an accident on his job, Mr. Owner may find himself the defendant in a damage suit.

Shyster lawyers are always looking for injury cases on a fee basis. These suits are costly to the owner to defend, even if he wins them, which he usually does not.

The history of the workmen's compensation principle is most interesting and affords material for inexpensive advertising if printed in pamphlet form, using a space for your firm name and a few lines showing its advantage to the customer.

Let me outline briefly the five periods through which workmen's compensation has been developed.

The first period had its inception in olden times and is known as the

Don't Keep Your Compensation Insurance A Secret!

By W. A. Conkling

Secretary, Tulsa, Okla., Sheet Metal Contractors Assn.

domestic system. Raw materials were delivered to homes and families worked as units. This naturally created an intimate relationship between employer and employee and any accident to a worker was necessarily a loss to the employer, who by custom or apprenticeship agreement was bound to care for the injured. Thus, at this early time, there was no need for a systematic method of distributing costs of industrial accidents.

This period ended about 1764 and was followed by a period of industrial revolution, which, with the advent of machinery and the necessity for housing several machines together, developed the factory system. During this time (from 1764 to about 1880) the employer was re-

sponsible only for accidents due to his negligence. The increasing use of machinery brought an increase in both the number and severity of accidents. The adjustment of damages quickly found its way into the realm of court action, which soon brought on employer's liability legislation.

The third period began with the passing of the Employer's Liability Act in England in 1880. Similar acts were passed in the United States in 1886. These acts soon proved unsatisfactory as they attempted to protect the worker only.

The fourth period of development followed rapidly and introduced the first workmen's compensation laws in England in 1896. These laws provided for compensa-

UPTON SHEET METAL WORKS		FOR CUSTOMER'S USE ONLY	
Cornices, Skylights, Tanks, Ventilators, Fire Doors, Metal, Slate and Tile Roofing		REGISTER NO.	VOUCHER NO.
PHONE 4-5882		P. O. B. CHECKED	
TULSA, OKLA.		TERMS APPROVED	
816 EAST 6TH ST.		PRICE APPROVED	
CUST. ORDER NO. & DATE REQUISITION NO. CONTRACT NO.		CALCULATIONS CHECKED	
REFERS TO INVOICE INVOICE DATE VENDOR'S NO.		TRANSPORTATION	
SOLD TO		FREIGHT BILL NO. <input type="text"/> AMOUNT MATERIAL RECEIVED 19 <input type="text"/> SIGNATURE <input type="text"/> TITLE SATISFACTORY AND APPROVED	
SHIPPED TO AND DESTINATION DATE SHIPPED HOW SHIPPED AND ROUTE TERMS		ADJUSTMENTS	
FROM P. O. B.		ACCOUNTING DISTRIBUTION	
QUANTITY		DESCRIPTION	
		PREPAID OR COLLECT?	
		UNIT PRICE	
		AMOUNT	
WE CARRY COMPENSATION AND LIABILITY INSURANCE FOR YOUR PROTECTION.			

The Upton Sheet Metal Works places a line along the bottom of all order sheets calling attention to their insurance protection

**Furnace, Spout Work
Now Season's Demand**

**Southern Cornice Works
Advises Against Delay**

If the furnace needs fixing, or the rain spouts or gutters need repair or attention, better get it done now, cautions J. W. Tidwell of the Southern Cornice Works, 118-120 S. Cincinnati av.

With summer fast passing and fall and winter soon to come, Mr. Tidwell admonishes that now is time to prepare for wet weather and cold days ahead. It isn't from selfish interest to make business better either, he states.

"It is just as much to the interest of the customer as the shop proprietor to get such work done now," says Mr. Tidwell, adding that besides protection offered there is actual savings in dollars and cents.

"We are not a lot different from the coal man or other folks whose business is regulated by seasonal demand," reports Mr. Tidwell. "You can always get a better job for less money when times are slack."

"Anyhow," he also adds, "all building repair work should be done in weather that will enable a repair man to get in a full day's work." "You can't repair gutters or rain spouts when they are full of water."

The Southern Cornice Works, which is Tulsa's oldest sheet metal enterprise, offers complete furnace and heat equipment overhauling service. Embodied in call for such service now is the general cleaning out and reconditioning of systems, the replacing or wornout fume pipes and the recovering of hot air pipes.

Workmen employed by the Southern Cornice Works are protected by workmen's compensation insurance. The concern carries both workmen's compensation and public liability insurance, and this, it feels, is something that should be called to the public's attention. Such insurance relieves anyone engaging it from responsibility in case of damage or accident.

Regrettable as it may seem, Mr. Tidwell points out, that the public's desire to help unemployed through offering any and every kind of odd job is dangerous. In case of damage or accident those hiring such work are liable, and those of course are generally unprotected by insurance.

A Tulsa newspaper story which gave insurance a boost.

tion for industrial accidents regardless of fault. Constitutional difficulties retarded the development of similar laws in the United States until 1910 when our first state workmen's compensation laws were passed. These developed rapidly until at the present time they are in effect in practically all of our states.

The fifth period was one of accident prevention. State and City laws made it necessary to guard machinery. "Safety First" became a national slogan and through safety campaigns, thousands of dollars were saved to industry and hours of suffering from needless accidents were saved to workers.

Thus we arrive at the present time with a compulsory system of insurance to take care of industrial

accidents. The worker has but to show that his injury arose out of and in the course of employment and he receives assistance at once. His return to work is speeded, a better feeling is created between worker and employer and through service of the insurance companies accidents are reduced and employee, employer and public are all benefited.

Have a talk with your local insurance man and learn the many important facts about compensation insurance. This form of insurance is the least solicited of all insurance because it is the least profitable. This fact alone should suggest that it is to your benefit to look into its many possibilities. This form of insurance is not only for your workmen, it can and should include your book-keeper, estimator, collector, etc. The rate under these classifications are low.

Even you, Mr. Contractor, should be included in this protection. As manager of the business you are eligible and at a low premium rate. Since workmen's compensation is compulsory your competitor has this item of expense the same as you do and when you are billing a job done on a basis of cost plus a certain percent of profit, don't forget to include this item. It is one that your customer should be glad to pay, since it is for his protection also.

If your business is incorporated, your active officers are eligible to coverage and at a low rate unless working as mechanics. Even then they are insurable, but at a higher premium rate. In most states workmen's compensation insurance is compulsory if you employ two or more men. If you employ one man and work as a mechanic yourself, you should have coverage on a two-man basis.

Generally, in case of accidental injury, doctors and hospital bills are paid and the worker receives two-thirds of his weekly wage not to exceed \$18.00 per week.

In most of our states an indus-



**Replace
Rain Pipes**

Expert workmen are now available at greatly reduced cost.

Southern Cornice Works

A Complete Sheet Metal Shop
118-120 S. Cincinnati
Phone 2-1546

We Carry Public Liability and Workmen Compensation Insurance

Tulsa firms put insurance information in their advertisements.

trial commission adjusts injury claims and for this reason your employee does not need the services of a lawyer to receive a just settlement. Acquaint your worker with this fact and as it naturally follows that your premium rate will increase with the number and severity of accidents, you will save yourself dollars and your workers much suffering if you will teach them to be careful. A firm of sheet metal contractors in my city have had three accidents in the past few years which cost the insurance companies a total of about \$6,500. Could your business have stood this cost?

And, lastly, do not overlook the first cousin of workmen's compensation. It is Contractors' Public Liability Insurance. It carries a low premium and protects the public, and incidentally you, from injury due to some act of your employee. For example, the employee in the following actual case might have been your man, working on a ladder or the roof of a marquee. "An employee of a contractor, while working, let fall a chisel which struck a passerby, resulting in a verdict of \$5,000 against the contractor, which the insurance company paid."

AMERICAN ARTISAN

Air Conditioning Section

Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings

. . . . ONE of the cardinal points of selling and business is—"Keep old customers satisfied."

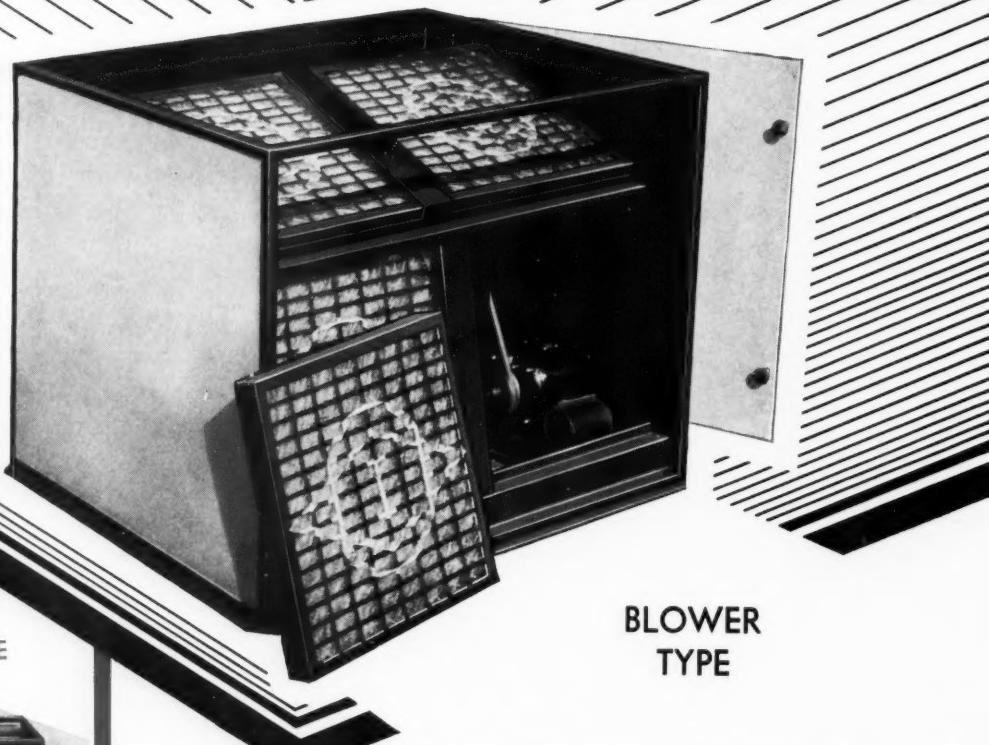
. . . . Heating contractors are offered a splendid opportunity this month to exercise this commandment by inspecting old installations and carefully checking the control system.

. . . . Tremendous progress has been made in control equipment and hookups in the last few months. Jobs older than one year very likely can use new equipment or new hookups. The results obtained by alteration should please any customer.

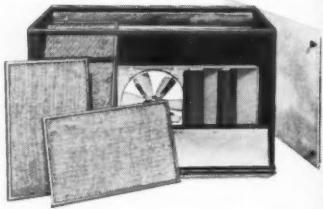
. . . . "Let us check your control system" is a logical and profitable means of keeping contact with old customers.

November, 1933

THE AIR PACKAGE



AIR PACKAGE
FAN TYPE



The ideal unit for gravity systems—*inexpensive, complete, economical.* Includes Air Controls, Over-size filters, (Permitting gravity circulation) and 3 speed fan within the casing. *Made to fit any size furnace casing.*

AUTOMATIC
CONTROL KIT



Automatic Control is essential for maximum comfort, economy and convenience. Control Kits are available for Air Packages used with coal, oil or gas fired furnaces.

BLOWER
TYPE

MODERNIZE WITH MODERN IDEAS

Here is a package of winter air conditioning equipment developed from almost 30,000 satisfactory installations. . . . It does away with much costly estimating time, delays in ordering and receiving material and useless scrap. . . .

AIR PACKAGES are built in fourteen sizes to fit all size furnaces, or to modernize any existing systems. Your customer pays less, yet you make more profit, because—it is complete. . . . Extra material and labor needed to fit the furnace is unnecessary. . . .

Display an AIR PACKAGE in your window as an authorized dealer. . . . Get orders today.

For further details write to



DIVISION OF
THE CLEVELAND HEATER CO.

1960 West 114th Street CLEVELAND, OHIO
Successor to THE WARM AIR FURNACE FAN CO.

Atomization— [Part II]

In Part I We Told How Oil Combustion Is Obtained.
This Article Tells What Oil Combustion Actually Is.

By Eugene Parker

To the layman, combustion is a simple everyday process and yet, while he deals with it constantly in his own home through many processes and even though it happens in his actual presence many millions of times each year in the engine of his automobile, he gives it little thought and even understands it less after this experience because he takes it for granted and accumulates only a smattering idea of the fundamentals involved.

Combustion Principles

It will probably be of interest, since we have determined how to obtain combustion with oil in the preceding article, to determine what fundamentals are involved other than the mechanical ones in obtaining the most from the combustion after it has been produced in an oil burner.

Oil is a carbohydrate; that is, it contains both carbon and hydrogen.

By the application of heat and mixture with air, the oil is oxidized, producing a condition known as burning, which burning is the uniting of carbon and hydrogen with oxygen.

Carbon has a dual valency; that is, each unit of carbon unites itself with either one unit of oxygen or with two units of oxygen.

The first is known as carbon monoxide, which is an extremely poisonous gas. The second is known as carbon dioxide or CO₂. The oxidation of carbon to the monoxide develops for each unit of carbon so oxidized a definite and fixed quantity of heat. The conversion of the monoxide to the dioxide forms an additional definite amount of heat.

(Note.—By the expression "amount of heat" it is intended to differentiate between degree of temperature and amount of heat.)

Irrespective of how accomplished, if all the carbon in the fuel is converted into the dioxide, there has been developed the maximum amount of heat obtainable from the fuel so converted. Large excess of air admitted to the combustion area, with resultant free oxygen, will not decrease the amount of heat generated by the fuel, but will decrease the temperature of the combustion area.

Regarding the contention that fire brick insulates the heat-absorbing surface of the furnace, the fire brick retort will absorb enough heat to bring its temperature up to that of the flame or gases with which it has been brought in contact, after which no further absorption can take place without radiation. After this absorption has taken place, any heat generation must either be absorbed by the furnace or go up the chimney.

Furnace Efficiency

Furnace efficiency is measured by heat absorption. Heating efficiency by proper radiation of the heat absorbed by the furnace.

Three factors determine the amount of heat absorption: (1) The difference in temperature between the absorbing areas in the furnace and the combustion chamber to which it is exposed.

(2) The conductivity of the material exposed to the fire box temperature.

(3) The area of the absorbing surface so exposed.

Carbon is a very poor conductor of heat. A carbon deposit on the absorbing surface materially decreases heat absorption by insulation.

One pound of air occupies a greater space when hot than the same pound of air when cold. Therefore, hot gases are lighter per square foot than cold gases. This causes hot air to rise, for the same reason that a cork, being lighter than water, will rise in water.

Draft Principles

In the average furnace, the exhaust is placed at the top of the furnace to utilize the "draft" caused by the difference in weight of the hot gases in the flue and the colder atmosphere surrounding it. If the generated heat be directed close to the outlet, it flows directly to it and comes in contact with but a small percentage of the heat-absorbing surface of the furnace. As a result, there has been but little heat absorption, with a resultant high stack temperature.

Properly constructed fire brick retorts or baffles accomplish definite advantageous results. These are as follows:

(1) Because of relatively poor conductivity of heat, high degrees of temperature are attained in the retort or combustion area.

(2) High temperatures vaporize and break down the fuel, eliminating a certain proportion of free carbon, which becomes incandescent.

(3) Oil vapor and incandescent carbon have a strong affinity for oxygen.

(4) In a properly designed retort, vaporized fuel and incandescent carbon are more intimately mixed with the oxygen supplied by the administration of air.

(5) A larger percentage or all of the carbon is converted to the dioxide and all heat units contained in the fuel are by such oxidation generated.

(6) A properly designed retort makes possible

(Continued on page 40)

Automatic Controls

Did you follow the discussion of the first two hookups? We begin in this issue a discussion of the third control system in which the room thermostat is the master control. In this system the fan control and the limit control are wired in series with the room thermostat so that when the room thermostat is satisfied the entire system shuts down. The operating characteristics are explained in this article.

So far in this series of articles we have discussed two systems of automatic control for coal fired heating plants. The first two articles (June and July) showed a very simple hookup. This first hookup consisted of a room thermostat to operate the draft and check and a bonnet control to start and stop the fan. While this hookup required a minimum of equipment and very simple wiring, no means of preventing room temperature over-run or control over combustion was afforded—both serious drawbacks.

In the second system discussed (August, September and October) a bonnet limit control was inserted in control system number one and was so set that a runaway fire was prevented, resulting in less over-run of room temperatures, plus better control over the fire and combustion. However, because the fan continued to run until the bonnet temperatures were down to the fan "off" setting, there was some room temperature over-run and the system was difficult to balance for all kinds of weather.

Our Third Hookup

This second system is, however, the basis for the third hookup on which discussion is begun here. This third system is a refinement of hookup number two in that the same instruments are used, but the units are so wired that the room thermostat becomes the master control, and when it is satisfied, the entire system is shut down.

The question might logically be raised: "If the draft closes on an accelerating fire and the fan stops when the room thermostat is satisfied, won't there be residue heat which goes to waste?"

This question is the real problem of this control hookup and ways and means of solving the problem will constitute the discussion in this article.

In order to get a clear understanding of just how this system operates and why the excellent results credited to it are obtained, some fundamental facts should be reiterated.

The primary purposes of any control system are: 1, maintain uniform room temperatures; 2, be dependable; 3, maintain as uniform a combustion rate as possible; 4, handle any sudden demands as quickly as possible; 5, provide safety and require a minimum of attention by the owner.

It is this ability to provide all five functions in nice balance which has made this third hookup popular.

In this third control system the room thermostat is the master control and subordinate to the room thermostat are two controls in the bonnet. One control, the limit control, handles the fire; the

second instrument, the fan control, starts and stops the blower. Each of these instruments operates independently of the other to provide bonnet temperatures of the correct figure to properly heat the rooms.

With these aims in mind let us consider how this system operates. Let us assume that the room in which the thermostat is located is cooling. We have set our thermostat to keep the temperature at 70 to 72 degrees. When the temperature drops below 70 degrees the thermostat calls for heat. The electrical current flows from the room thermostat and down the line toward the damper motor. In this line, between the thermostat and the damper motor, we have placed our limit control.

This limit control is inserted to do two things: First, it will shut off the draft and check the fire when the temperature in the bonnet reaches a point which we have selected as the highest temperature we want in the bonnet. Its second function is to return control of the draft to the room thermostat when the bonnet temperature falls below the "low" setting of the limit control.

The Limit Control

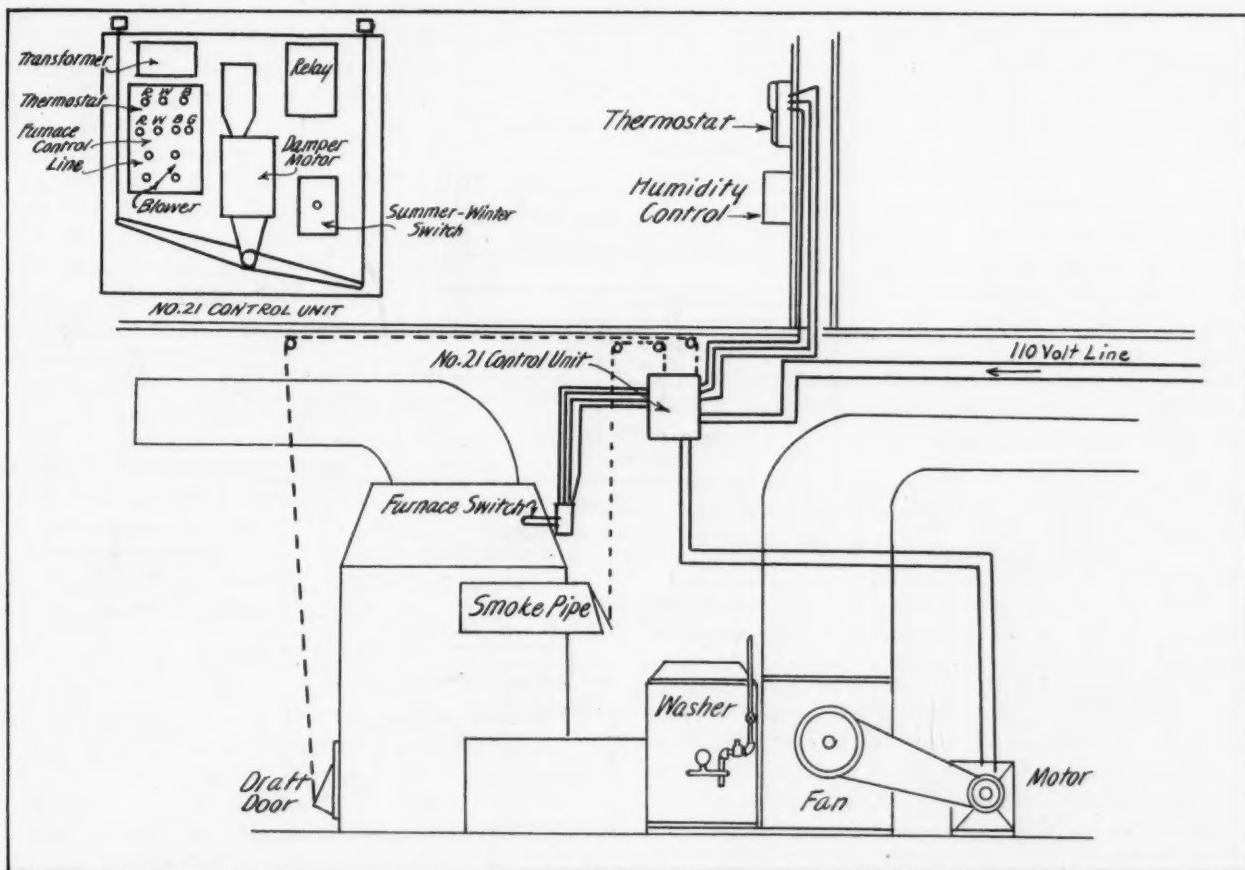
This function of the limit control might be explained another way. The limit control establishes a "zone" of operating temperatures in the bonnet. Any bonnet temperature that is above this zone causes the draft to close or remain closed. Any bonnet temperature below the zone causes the draft to open whenever the thermostat calls for heat.

But, the draft cannot open in this system unless the thermostat is calling for heat, even though the bonnet temperature is below the zone. This is a basic function of this particular system and is one of the reasons why we said that in this hookup the room thermostat is the master unit and controls the functions of all the other instruments.

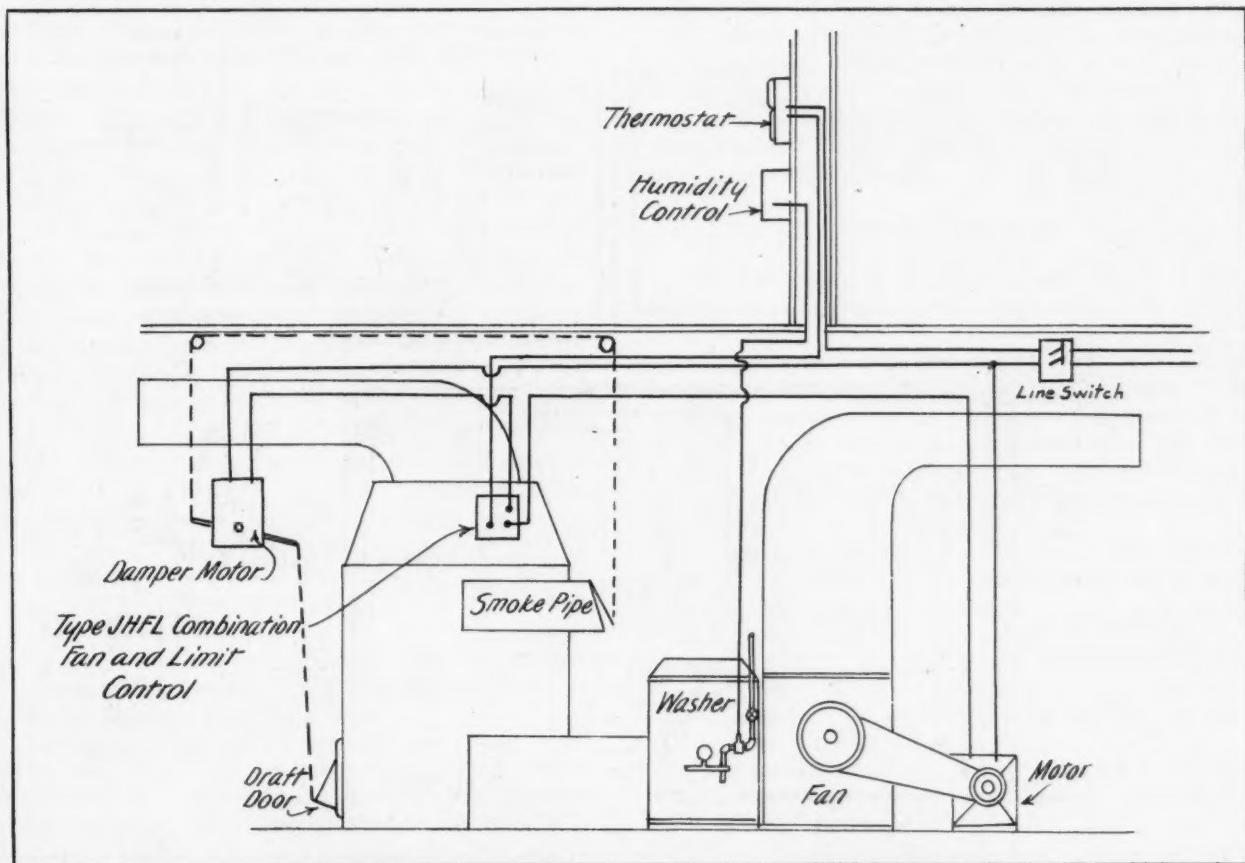
Systems wherein the fire control operates without the sanction of the room thermostat constitute an entirely different group of control systems and will be discussed later.

To continue our typical operating cycle, let us assume that the current flowing from the room thermostat reaches the limit control and finds the temperature in the bonnet is above the operating zone we have established. Because the bonnet temperature is above the operating zone, the current from the room thermostat finds the circuit open and cannot reach the damper motor, so the draft does not open.

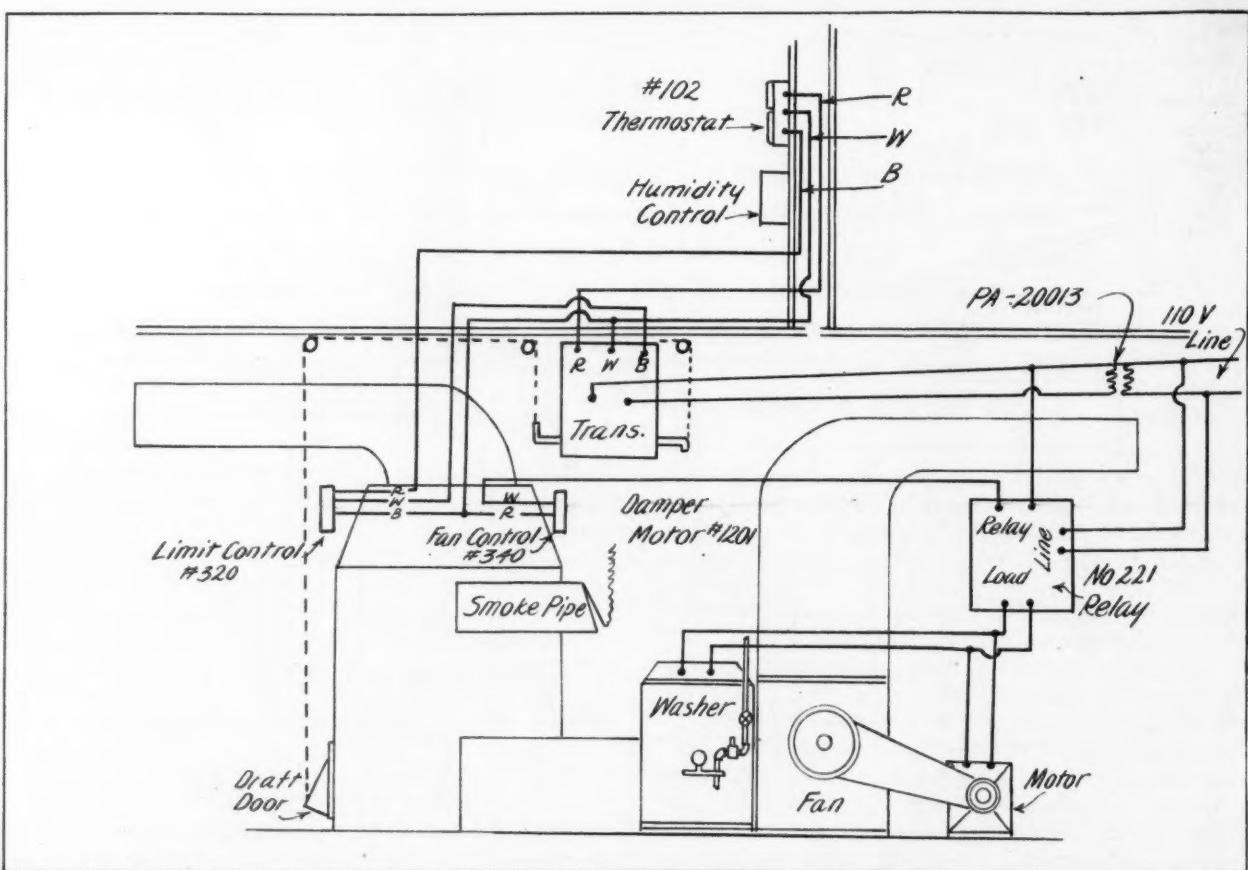
This is as it should be, because the air in the



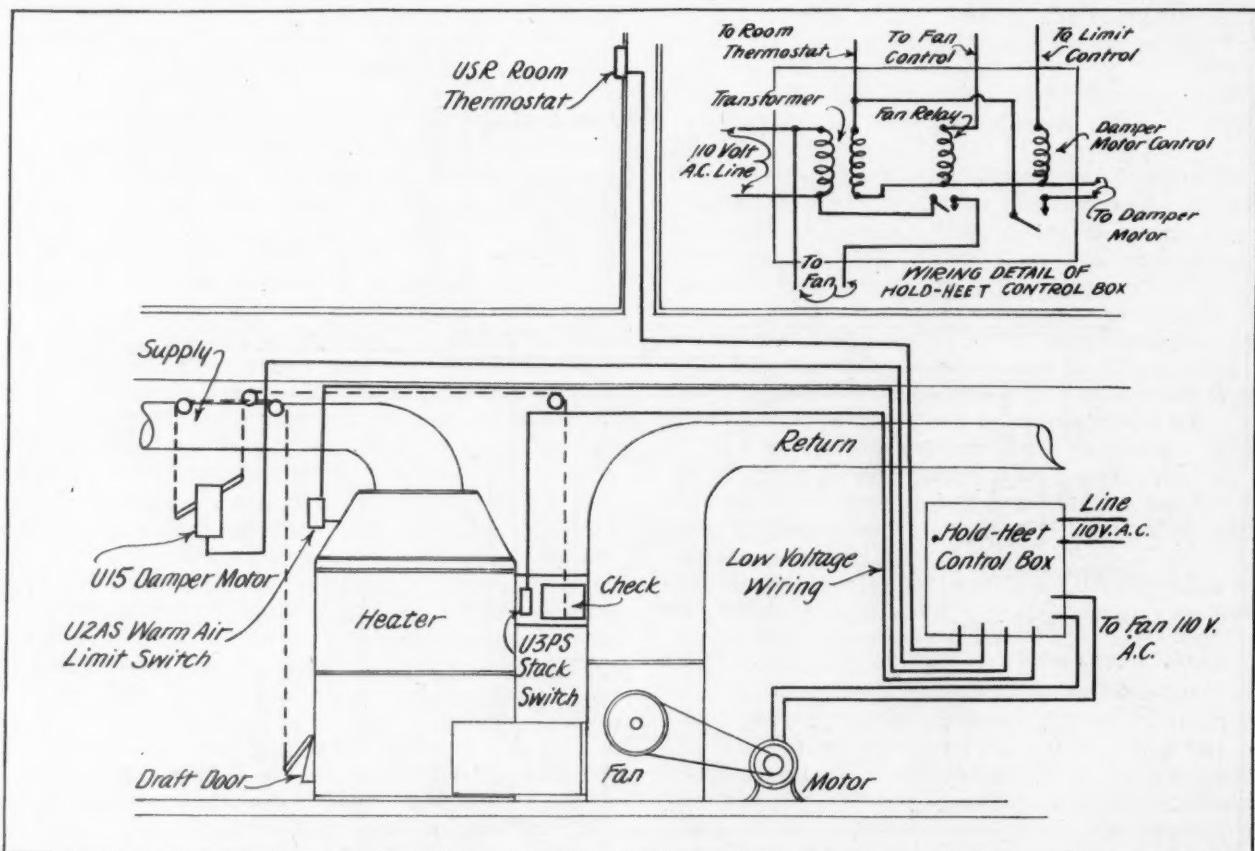
In the system diagrammed above, the room thermostat is the master control. When the room thermostat is satisfied the entire system shuts down. To provide simplicity in wiring, the control box contains the damper motor, relay, transformer, summer-winter switch and a wiring panel. The bonnet instrument is a combination fan, limit and safety control. All instruments are manufactured by the Cook Electric Co., Chicago.



In the system above a two-circuit, combination fan and limit control is used to simplify wiring. One circuit operates the fan and is adjustable from 100 to 500 degrees. The other circuit is the limit control used to prevent too-high bonnet temperatures. The unit is wired in series with the room thermostat so that when the thermostat is satisfied the fan stops and the draft closes. The manufacturer of the equipment is the Penn Electric Switch Co., Des Moines.



The diagram above showing instruments of the Pioneer Heat Regulator Corp., Dayton, Ohio, employs a separate limit and fan control both wired in series with the room thermostat so that when the thermostat is satisfied the entire system shuts down. The company suggests limit control settings of 125°-150° in mild weather; 150°-200° in severe weather; a fan "on" about 10 degrees higher than limit "low"; a fan "off" about 15 degrees below the limit "low."



The diagram above shows another system using a control box to house the relay, transformer, and motor control. The detail diagram shows the wiring through the units in the control box. This diagram shows the limit control in the stack where closer control over combustion is claimed for the location. The text explains some of the reasoning behind the stack location. All equipment in this diagram is made by Russell Electric Co., Chicago.

bonnet is above our operating zone so it is not necessary to accelerate the fire.

In this system our electrical current from the thermostat also follows a second path—the path leading through the blower control to the blower motor. In this path from thermostat to blower motor we have placed our second bonnet instrument—our fan control, which starts and stops the blower.

This instrument, like the limit control, has also been set for a temperature zone. The fan will run if the thermostat is calling for heat and the bonnet temperature is in the fan operating zone.

If, when the room thermostat calls for heat, the bonnet air is higher than the operating zone of the limit control, we know that the air must be in the fan zone and so the fan can run. The current coming from the thermostat finds this circuit closed and continues to the blower motor, starting the fan and blowing warm air into the room.

Operating Cycles

It is easy to see from this discussion that, while the system is simple in function, a number of variations in what happens as the room cools down can occur.

For example, if, when the thermostat calls for heat, the bonnet temperature is below the limit control operating zone, the limit control lets the current flow through to the damper motor, closing the check and opening the draft. As the fire accelerates, the bonnet temperature rises until it reaches a temperature above the limit control zone when the limit control is satisfied and shuts the draft and opens the check, even though the room thermostat is still unsatisfied. In the meantime the temperature reaches the fan operating zone, starting the fan, which runs until the room thermostat is satisfied or the temperature of the air in the bonnet falls below the fan "off" setting.

As might be expected, this coordination of thermostat, limit control and fan control makes necessary careful selection of settings for the limit control. These settings were discussed in detail in the September issue in connection with our second hookup. Generally speaking, the same reasons for selecting settings for the limit control in hookup number two holds good for this third hookup, with the possible exception that, since the limit control must work so closely with the thermostat, even more attention should be paid to settings.

We should emphasize once again that in this system the limit control is an important unit in the system and too high a setting will usually kill the operation of the system. By this we mean that if settings like 250 degrees are used, the limit control becomes merely a safety control and not an aid to the operation of this system.

In this system, again, low settings for the limit control are suggested. In selecting settings, take the register air temperature, add to this the number of degrees in air temperature drop we estimate will take place in the ducts between furnace and register, then add ten or fifteen degrees for safety and make this temperature the "low" setting of the limit control.

As an example, say our register air temperature is 135 degrees. We estimate the duct loss will be 15 degrees. We also add 10 degrees for safety and we have $135 + 15 + 10 = 160$ degrees for the "low" limit setting.

On most controls the differential between limit control "high" and "low" can be changed within a certain range. The differential may be as low as 15 degrees or may be as high as 100 degrees. As we said previously, the setting we want is some temperature which permits the furnace to maintain our bonnet temperature when the fan is running and yet keep bonnet temperatures and flue gas temperatures from running away, which prevents heat loss.

Wide differentials are generally less advantageous with this system than close differentials. By wide differential is meant 100 degrees or thereabouts and by close differential 15 to 25 degrees. Just how close the differential can be set must be established by experimentation, because it depends upon the responsiveness of the fire and the balance in capacity between furnace and fan. If the furnace delivers heat as rapidly as the fan carries heat away and if the fire is responsive, then the differential can be made as small as 15 degrees.

Small differentials have the important advantage of giving more frequent openings and closings of the draft door, which, in turn, means that our fire is always generating heat just about as we need it and neither runs away nor fails to keep up.

A suspected differential which is too close can be checked by watching the fan. If the fan has to start and stop frequently after the thermostat calls for heat, it is pretty certain that our limit control differential is either too close for the furnace and fire and the furnace can't keep up with the fan or the limit control "high" is not high enough. In this case the differential should be increased or the limit control "high" should be raised bit by bit until a balance is struck.

Furnace Construction

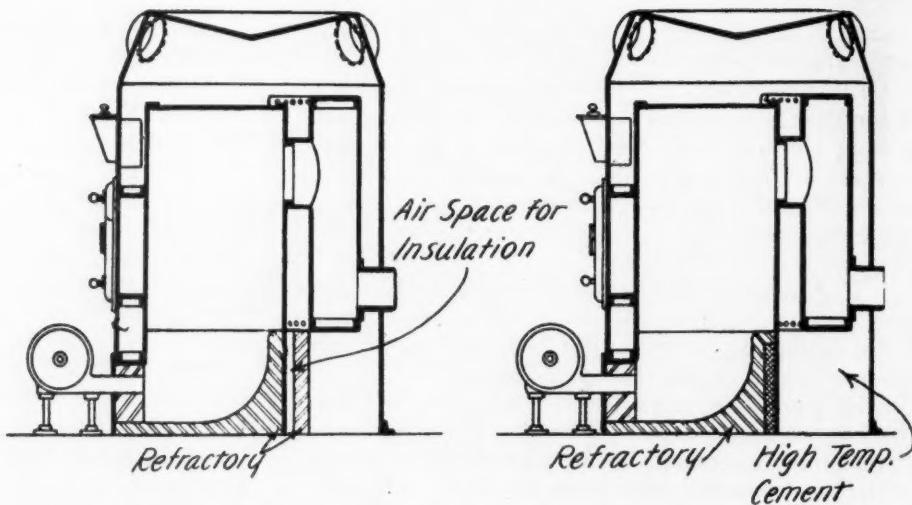
In discussing this limit control setting, a word might be said about furnace tightness and residue heat.

If the furnace is not tight, there will always be some draft and the fire may burn faster than we like during periods when the fire should be checked. Some engineers claim that they get best results with an absolutely tight furnace and that when the thermostat is satisfied they want no draft and hence no fire acceleration.

A more moderate view might be that this depends upon conditions. In mild weather, with some types of fuel like coke, a tight furnace may cause trouble by letting the fire go out several times a day. Of course, the contractor can open the ash pit door slide to allow enough draft to maintain a fire, but this is putting control on the furnace and not on the control system.

On the other hand, the trouble of too much draft from warped doors is serious in certain systems where there is a decided gravity action through the furnace. In such installations any heat generated will pass to those rooms with the greatest gravity action and it is likely that serious overheating of these rooms will occur.

Know Your



Refractory Linings —

They can make or break an otherwise satisfactory installation

By R. C. Nason

WARM air furnace dealers are fortunate indeed if they escape service calls in connection with their oil burner and mechanical stoker installations. Automatic controls and mechanical parts account for a few of these expenses, but excessive sooting is one of the commonest causes of trouble. Often the root of the difficulty lies in imperfect design or condition of the combustion chamber.

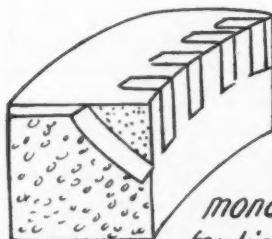
Just as any good warm air plant will not give maximum satisfaction without the proper fuel, so any stoker or oil burner is never at its best unless provided with the proper sort of refractory chamber surrounding the burner. Most warm air heaters continue to use round grates and circular casings, hence the problem of correct refractory chambers here is simpler than when a rotary burner is placed in a rectangular boiler or a gun-type or rectangular stoker tuyere in a round heater.

Before installing refractory lining, either of brick or monolithic, in a furnace that has previously used

coal, the metal surfaces to which the cement is to be applied must be absolutely clean. Remove as much of the grime and soot as possible by vacuum cleaner, then use a good wire brush to get right down to the clean surface. These directions are fundamental.

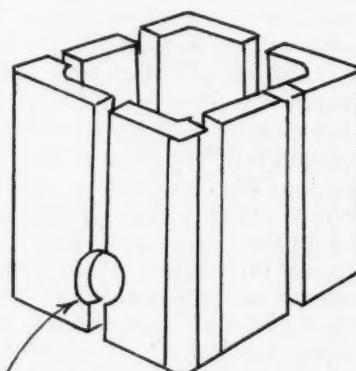
Next close all cracks, fallen-out high temperature cement between sections and, while one is doing it, he might well remove all soot and fly ash from the grate to the chimney flue. Cement the base ring and make everything as tight as possible, because the owner is going to expect vastly better results from his oil burner or stoker and a spotlessly clean furnace internally always is a keystone of effective heating.

With stokers, most of which in domestic sizes have round burning plates, or tuyeres, refractory lining differs radically according to whether the coal to be used is expected to clinker or to ash. With the



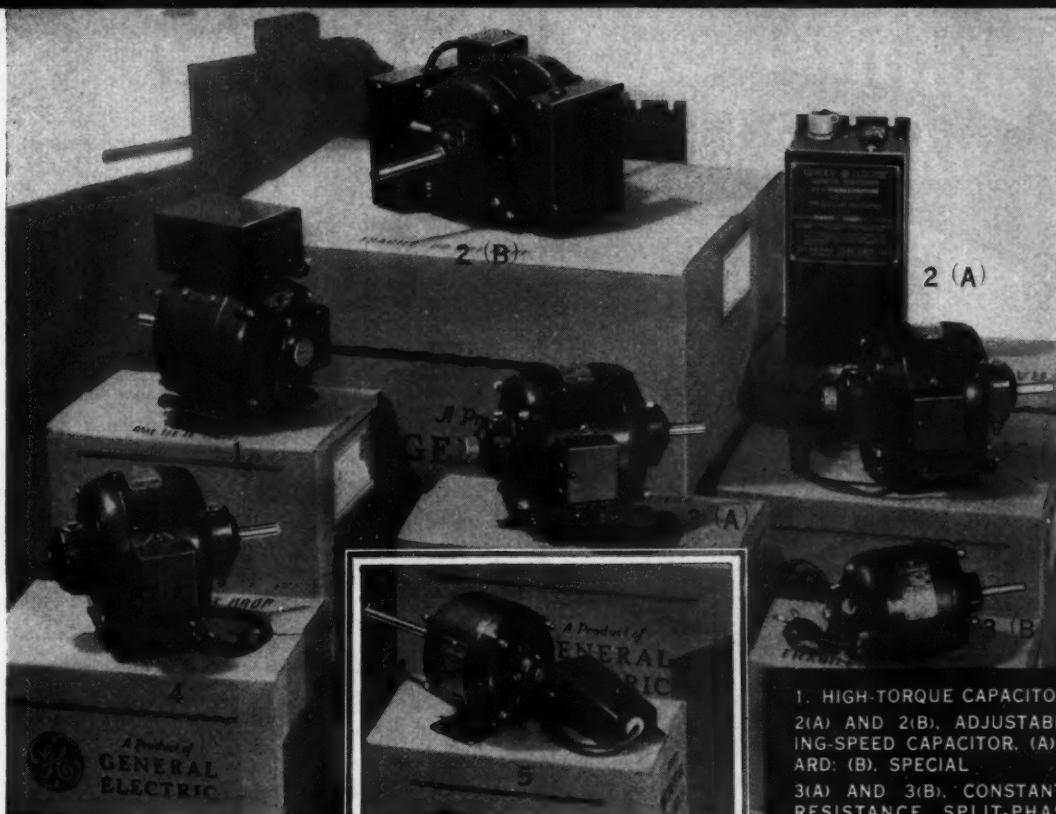
Special refractory monolithic shape popular for lining warm air furnaces when round oil or stoker burners are to be used

The illustration at the top of the page (Fig. 1) shows a correctly lined burner pit. To the left and right are typical blocks (Fig. 1 & 3)



Hole for gun type burner nozzle

PACKAGES OF POWER FOR AIR CONDITIONING



1. HIGH-TORQUE CAPACITOR
- 2(A) AND 2(B). ADJUSTABLE-VARYING-SPEED CAPACITOR. (A). STANDARD; (B). SPECIAL
- 3(A) AND 3(B). CONSTANT-SPEED RESISTANCE SPLIT-PHASE. (A). STANDARD; (B). SPECIAL
4. CONSTANT-SPEED POLYPHASE
5. PERMANENT SPLIT-CAPACITOR

WHERE LOW TORQUE IS REQUIRED . . . For air filters, atomizers, air conditioners, humidifiers, unit ventilators, window ventilators, oil burners, and other domestic applications — General Electric recommends the Type KC permanent-split capacitor-motor (No. 5 above).

This motor has a low-torque fan winding which makes it particularly suitable for applications like these. It is quiet operating. Where adjustable speed is required, motors are available with capacitor-transformer three-speed control.

Our fractional-horsepower motor specialists, located in principal cities, will be glad to tell you more about the Type KC (illustrated above) and about our complete line of electric equipment — transformers, control, wire and cable, etc. General Electric, Schenectady, N. Y.

[Check those fractional-horsepower motor applications concerning which you would like further information, and return this coupon to the nearest G-E office, or to General Electric, Dept. 6-201, Schenectady, N. Y.]

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Air Washers

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Automobile Heaters

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Cabinet-type Units for heating, cooling, humidifying, dehumidifying, washing, and filtering air

Domestic Air Conditioners

Exhaust Fans

Fans

Forced Draft Units

Furnace Fans



Garage Heaters

Humidifiers

Incubator Fans

Industrial Air Conditioners

Kitchen Ventilators

Paint Spray Booth Fans

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Railway Car Precooling Units

Refrigerator Fans

Room Coolers

Rotary Roof Ventilators

Schoolroom Heaters

Special Devices

Unit Coolers

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Unit Ventilators

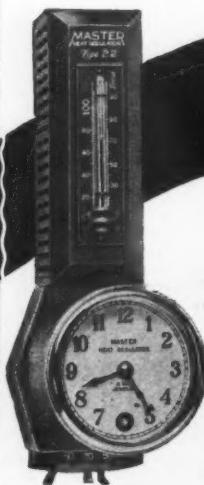
Window Ventilators

210-235

GENERAL  **ELECTRIC**

Help Yourself TO MASTER HEAT REGULATOR

Profits



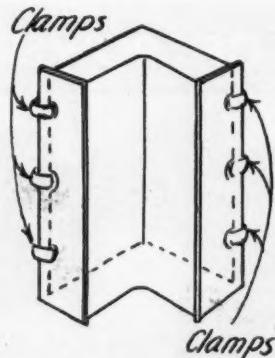
THE big profits in the heating business today are going to the dealer who is equipped to sell *heat saving* and *heat convenience*. These important selling factors are provided for him in the Master Heat Regulator.

Many home-owners—right in your own community—have long suffered from the drudgery and inconvenience of home heating without automatic regulation. A large percentage of these are literally *waiting to be sold* the manifold advantages of temperature regulation. The Master best meets this need.



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WHITE MANUFACTURING COMPANY
2362 University Ave. St. Paul, Minn.

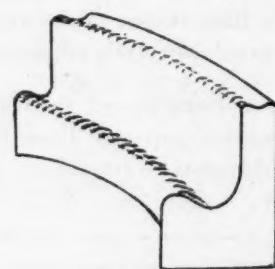


Sheet metal form for making precast monolithic fire cement corner pieces for combustion chambers for gun type burners for rectangular heaters

Fig. 3 & 4. Sheet metal forms for casting lining block can be made in any shop as shown to the left. Several types of clamps may be used. In the center is a circular lining with fire rim

former type the space between the inner shell-surface and the burner is built flat into what is known as a deck. Thus the clinkers are shoved away from the burner as fresh fuel is fed and repose on the deck around the periphery for tong removal. Decks can be constructed of fire brick base with refractory topping or with prepared high temperature filling that comes in discs, small pieces of which are tamped solid and smooth on the top for fusion and hardening under natural stoker heating.

With the ash removal type of stoker, again, which avoids clinkering coal, the warm air furnace installer merely lines the ashpit and firepot either with an outer ring of fire brick coated on the inside with refractory cement or by using special monolithic, shaped pieces much as seen in Fig. 1. This procedure follows rather



Segment of monolithic precast outer top rim of combustion chamber for rotary oil or stoker burners

closely that followed for rotary oil burners and is in contrast to gun type burners. The latter class of burner utilizes special shapes backed either with an air space or insulating cement about as seen in Fig. 2.

Not long ago in a small New Jersey city a furnace contractor received a complaint that although his cus-

Here's How the MILES Junior Air Conditioner Solves One Problem

WHEN, for instance, you are doing a replacement job, and you run into some 10-inch outlets, and you figure, according to the Standard Code, they ought to be 12-inch outlets;

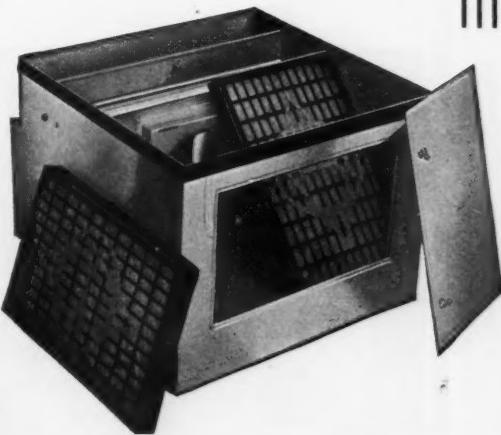
It will cost money, perhaps be impractical, to replace the old warm air pipes with up-to-size ones. And even then, the owner will have only a good gravity installation.

Here, if you add a Miles Junior Air Conditioner, you can use the old outlets, and give the home owner all the heat he will want on the coldest days, plus the major benefits of air conditioning.



The Miles Junior Air Conditioner is a benefit to everybody in every way. You need it in your business. Write for particulars.

MILES FURNACE FAN DIVISION
of The Henry Furnace & Foundry Company
3471 E. 49th St., Cleveland



BIG NEWS!
A REAL Oil Burning Furnace

What the public wants, what thousands of home owners are asking for, is a REAL, honest-to-goodness oil-burning furnace.

That's what this new Waterbury model is. Not a conversion type! It is MADE FOR BURNING OIL—designed by Waterbury engineers to obtain the utmost fuel economy from oil fires.

Its large combustion space insures complete combustion of the oil. Its unusually long fire travel and tremendous heating surface provide real efficiency and a low stack temperature.

Permanently OIL-TIGHT. Seamless

welded steel throughout. No cemented or cast-iron joints. Not a chance for leakage of oil fumes, soot, odors or poisonous gases.

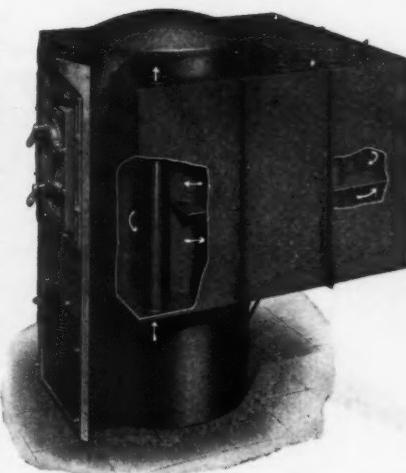
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Nothing now on the market offers so much in comfort, efficiency and simplicity of operation as the new COMFORTROL Air Conditioning System. It gives simply deluxe performance.

Waterbury GAS Furnace—designed by one of America's leading gas engineers—new safety features—seamless welded steel—gas-tight! Write for special folder.

With the Waterbury agency and this new complete line, prosperity is right ahead for enterprising dealers. Let us give you complete information. Write us today!

WATERBURY SEAMLESS STEEL Oil Burning Furnace



The WATERMAN-WATERBURY CO.

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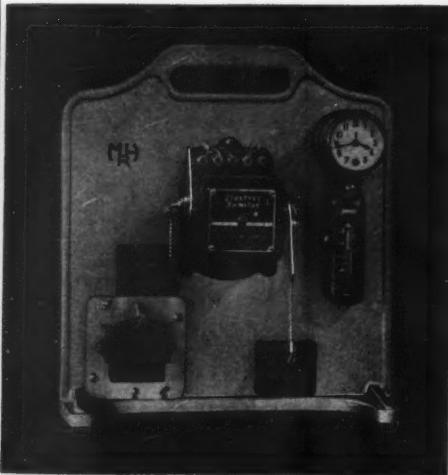
November, 1933

This ELECTRIC JANITOR DEMONSTRATING DISPLAY

WILL BUILD SALES

■ THIS completely equipped display and demonstrating stand, ready for mounting your Electric Janitor, either model, is supplied without cost with orders for 8 or more Electric Janitors. Minneapolis-Honeywell's lowest priced regulator for all domestic coal, coke or similarly fired heating plants. Order through your jobber or write for further information. Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota. Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL Control Systems



tomer used No. 1 oil, sooting was so bad that odors of oil filled the house. Further, oil consumption was abnormally high. Actually the customer was using close to 300 gallons monthly to heat a six-room house.

The furnace dealer, whom we will call Rankin, although this is not his name, spent many anxious hours adjusting the burner, air, damper and making various tests of the products of combustion. Still the trouble persisted. There was a brick out of the combustion chamber just above the old grate line. Little was thought about it as the key to the complaint but Rankin, being a thorough artisan, replaced the brick

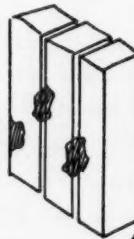


Fig. 5. Spalls or holes set up air turbulence which often results in noise and causes excessive oil consumption. Use only perfect blocks

Holes blown in edges of fire brick, usually between them at A, B and C, known as erosion. Pockets fill with soot to cause smoking, odors and rumbling

and faced it off with high grade fire cement. This done, the noise decreased, smoke ceased and fuel consumption was cut down.

What actually occurred was that the crevice created by the absent brick filled with soot and this became incandescent with each "on" period of the burner. Impingement of the burner, a gun type, against the sharp corners of the perfect bricks caused a rumbling sound.

Home Made Sections

This instance brings forcibly to mind the desirability of having lined surfaces as smooth as possible. Contractors can make up special monolithic circular shapes in their shop during off hours for future use. A satisfactory shape and the form for the corner pieces are shown in Fig. 3. The form should be made of perfectly flat 20 gauge sheets. The corner and side slabs, seen in Fig. 3, make an excellent combustion chamber for gun type burners whereas in Fig. 4 are shown precast pieces suitable for rotary burners.

Most of the precautions that apply to asbestos furnace cement as aptly apply to refractory cement and its use. To explain, avoid pitting, pocking, cracks, case hardening, blow holes, "spalling," erosion and like faults. The last point refers to the formation of small holes between fire bricks as shown in Fig. 5. They may be caused by direct impingement at close range of gun type flames, poor mixture or application of the cement bond and carelessness in troweling.

Properly mixed high temperature cement as used

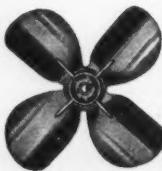


TORRINGTON FANS AND BLOWER WHEELS

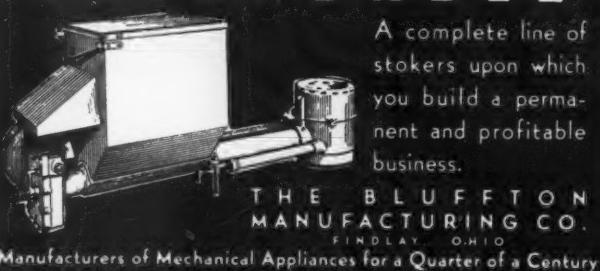
Patented All Aluminum Multiblade,
Balanced Blower Wheels. Unexcelled
for quiet and smooth operation.

32 years' experience building Propeller
Fans—assembled, balanced and tested
ready to mount on motor shaft.

THE TORRINGTON MFG. CO.
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A complete line of
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FINDLAY, OHIO

Manufacturers of Mechanical Appliances for a Quarter of a Century

FINDLAY STOKERS

in oil burner and stoker practice should be thick enough almost to pour. When troweled, moisture will show on the surface of the cement, but not in great quantity. The outer rims of warm air furnace hearths for burners most frequently are of fire brick, the joining faces of which have first been dipped into refractory cement, the idea being to secure a firm bond between



*Detail of monolithic corner piece
of complete precast hearth*

bricks but only a thin one. After "backer" bricks have been placed in position and bonded wash the inner faces of the bricks with cement. This fills the pores and retards "spalling," or chipping.

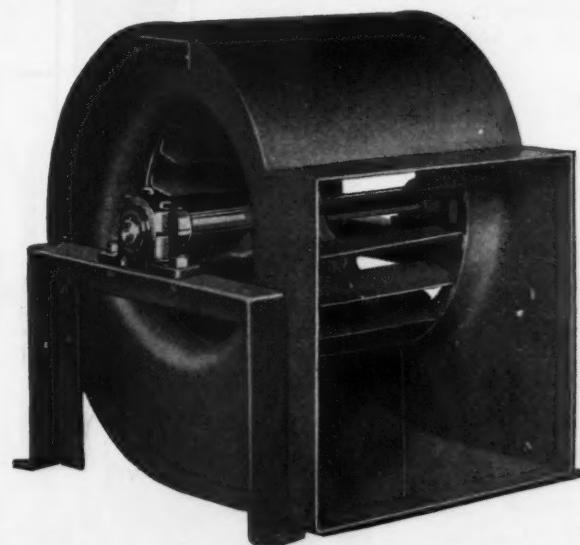
Occasionally warm air dealers are asked to patch combustion chambers that have loosened, cracked and eroded. Repairs can satisfactorily be made by chipping away the burned spots then dampening the parts with fresh water and applying cement with a trowel. If spots are large many contractors mix equal parts of crushed fire brick with the cement and reverse the bricks so that the unimpaired faces are towards the center of the firepot. Then only a washcoat of cement is necessary.

Insulating for Noise

As is well known in the warm air furnace industry, oil burners received setbacks for many years due to noise transmission up leaders and stacks. This can be eliminated by the judicious application of insulation. For sound insulation many installers now are covering the bonnets with cement, either asbestos or special prepared mixtures, to a depth of $1\frac{1}{2}$ inches. Let this jacket extend over the flue or smoke pipe, include the smoke hood, and carry along leaders 1 foot from the bonnet. Apply another coat of equal thickness over the ashpit base and, in the case of rotary burners, on the under side of the burner hearth plate.

It is coming to be generally appreciated that the shape of combustion chambers is almost as important as their size. It is unwise to try to place a square plug into a round hole, to make a rectangular combustion chamber for a rotary burner. The natural shape of warm air chambers, being round, calls for some means of diverting gun type flames so that there is no direct impingement on heating surfaces, and that the correct area of chamber is made available for the good combustion results.

Profitable FANS for furnace dealers



The FURNACE FAN

Here are two fans which every furnace dealer can sell at a substantial profit!

Buffalo Furnace Fans, for installation on warm air furnaces, have large capacity at comparatively slow speed—thus providing QUIET efficient air circulation. The fans were designed specially for the work—they are sturdy—easy to install—require no servicing.

The ACE COAL BURNER

This little blower may be sold for hot air, steam or hot water furnaces. It permits burning of the fine grades of hard coal, such as buckwheat and rice, and installed with the ACE Thermostat, provides automatic regulation of heat. Furnace dealers installing these fans make a substantial profit on every sale.



Complete data on both fans in bulletin form sent on request. Ask for Bulletins No. 2907 and 2912.

Buffalo Forge Company
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In Canada: Canadian Blower & Forge Co., Ltd.,
Kitchener, Ont.

COOK 218 CONTROL SYSTEM

*For Automatic Control—Winter and Summer—
Of a Furnace Equipped with a Blower—Burning
Hard Fuel.*

JUST 3 PIECES

Furnished Complete

• No. 12-3-A—Thermostat.

• No. 21—A combination of Damper and Blower Control, Relay, and Summer-Winter Switch.

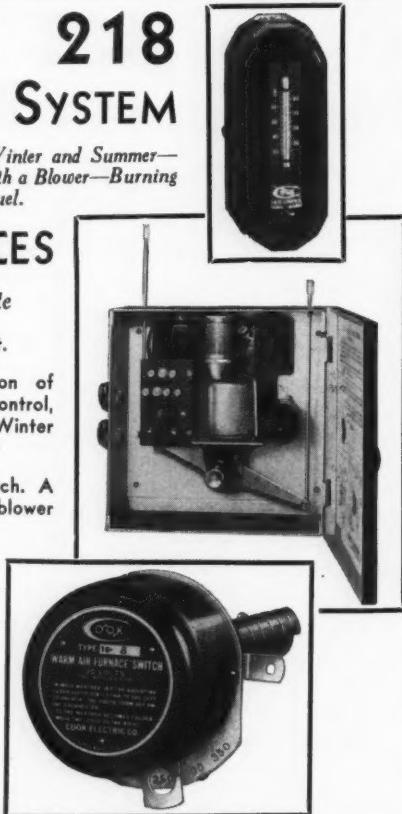
• No. 15-8—Furnace Switch. A combination of high-fire, blower and safety switch.

Kit: All necessary low voltage wires, chains, pulleys, etc.

• *Simple Installation*

• *Easy Wiring*

•



Guaranteed Equipment Manufactured by
COOK ELECTRIC CO.
2700 SOUTHPORT AVE. CHICAGO

MODEL "C"
COLUMBUS
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FITS IN TOP
BONNET OF
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MAKE
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Dealers
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A PHENOMENAL VALUE

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H & C
AUTOMATIC
HEAT CONTROL

Furnished Complete with every necessary fitting.

Offers the greatest profit opportunity in the heat control field. Investigate it at once.

Handled by leading jobbers.

HART & COOLEY MFG. CO.
61 W. Kinzie St.
CHICAGO, ILL.

Atomization (Continued from page 29)

complete combustion without the administration of excess air.

(Note.—Excess air reduces the temperature of the combustion area and, as before stated, heat absorption, being dependent upon differences in temperature, lower temperatures make for less heat absorption or decreased efficiency.)

Stack Temperature

You can readily appreciate that low stack temperatures are, for this reason, not the final answer. Large excess of air with low fire box temperature and a certain amount of heat absorption will make a low stack temperature, though there has been a comparatively small amount of heat absorption. The following hypothetical examples show this point very clearly:

Combustion Temperature

1800 degrees
2200 degrees

Flue Temperature

400 degrees
450 degrees

Heat Absorption

1400 degrees
1750 degrees

You will note that in the second instance cited above, the flue gas temperature is 50 degrees higher than that of the first, but the heat absorption is increased from 1400 to 1750 degrees, or 350 degrees greater heat absorption. The second instance, predicated on the same amount of heat but higher temperature, is by far the more economical.

It has been stated before that all heat generated inside the furnace must either be absorbed by the furnace or go up the flue.

Retorts can be so designed as to release the heat developed in the retorts at points close to the bottom of the heat-absorbing areas constructed in the furnace. The heat travel in the furnace from said bottom point to the flue is such as to make the heat developed come in contact with the maximum amount of heat-absorbing surface, thereby, by absorption, reducing flue gas temperature to the minimum. This retort, by having combustion completed in a chamber surrounded by hot surfaces, prevents flame containing incandescent carbon from coming in contact with the relatively cold heat-absorbing surface of the furnace.

Carbon Deposits

When flame containing incandescent carbon or carbon monoxide comes in contact with a cold surface, the carbon is chilled and combustion is not completed, depositing on the walls black carbon or soot, and prevents complete oxidation of the vapor, with a result that the combustion of some of the vapor is carried only to the monoxide and in neither case has all of the heat in the fuel been developed.

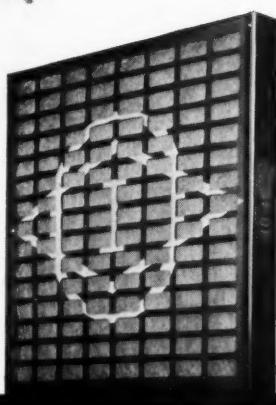
Theoretically, irrespective of how accomplished, the result desired is as follows: Thoroughly oxidize all of the fuel without the administration of excess oxygen. Bring the heat so developed into contact with as much heat-absorbing area as possible.



IF I WERE A FURNACE DEALER

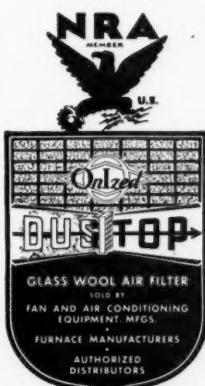
I'd Push Dustop™

because:



1. Dustop Filters provide the means for immediate profit
2. Dustop produces continual repeat business
3. Dustop keeps the door "open" to inspection, cleaning and repair service
4. Dustop is an entering wedge into the replacement and new furnace market

The standard Owens-Illinois Glass Wool Air Filter is low in cost, light in weight and easily replaced.



● Here is your opportunity to capitalize on the great interest in *clean air*. Now, you can equip warm air furnaces with Dustop filters and offer your customers and prospects the most perfect low cost heating system of the day. Just think—the warm air furnace—Dustop filter equipped—gives *cleanest heat!*

Dustop is easy to install and cleans air of impurities, including dust, dirt, lint, soot, pollen and bacteria, with remarkably *high efficiency*. You get the repeat business, too, of supplying new filters to replace saturated filters which are discarded.

Line up with Dustop today, and you have a *real, live selling program* to bring in new business—new profits. For full information, write to Owens-Illinois Glass Company, Industrial Materials Division, Toledo, Ohio. (Dustop is assembled and installed in Canada by General Steel Wares, Ltd., Toronto.)

OWENS-ILLINOIS

DUSTOP AIR FILTERS

Zone Control

IS HERE . . . !

NOW the problem of maintaining the desired temperature in all parts of houses of many rooms and those of the rambling type is solved! Zone Control — long desired by Heating Engineers—is now available through the use of "Genuine Detroit" Controls!

And Heating Engineers, who have carefully checked this simple, yet dependable Zone Control System say that it is the greatest heating improvement in years. It is the answer to a problem which has long perplexed them.

HOW ZONE CONTROL OPERATES

The house is divided into two or more zones in which different temperatures may be desired or in which difficulty is experienced in maintaining the same temperature. A main duct with branches leads to each zone. A Thermostat is placed in one of the

"GREATEST HEATING IMPROVEMENT IN YEARS" . . . say Engineers

rooms of each zone and a damper operated by a Motor Unit is installed in each of these main ducts.

Installation is simple and the cost low, because the Motor Unit is noiseless and can be mounted direct on the duct.

When any zone Thermostat calls for heat, the Motor Unit for that zone opens the damper it controls. At the same time it starts the blower and "turns on the heat" by operating a draft damper for coal-burning furnaces, a gas valve for gas-burning or a relay for oil or stoker fired jobs.

As soon as the Thermostat is satisfied, it closes the duct damper it controls—stops the blower and turns off the heat—*provided all other zone Thermostats are satisfied*. As long as any one zone Thermostat demands

heat, the blower operates and the heat supply continues.

UNIFORM HEAT FOR EVERY PART OF THE HOUSE

Zone Control assures uniform, even temperature in all rooms regardless of the exposure. It provides a quicker response when heat is required, and sends the heat where it is needed, without overheating the rest of the house. It prevents overheating; saves fuel.

With Zone Control, different temperatures can be provided to meet the needs of different zones. Individual temperature requirements for various parts of the house can be maintained automatically.

Write today for a complete story of this new improvement in furnace heating. Be the first in your locality to offer Zone Control. Ask for Bulletin No. 66.

DETROIT LUBRICATOR COMPANY

DETROIT, Mich., U. S. A.

*Canadian Representative: Railway and Engineering Specialties, Ltd.,
Montreal, Toronto and Winnipeg*

...the problem corner

Last Month's Rain Pipe Noise

American Artisan:

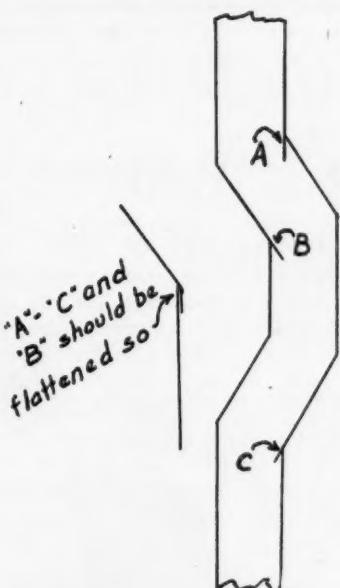
Please tell us if you have ever heard of a complaint on noise made by rain water dropping down a conductor pipe where the falling water strikes an angle and "rattles." On one of our jobs where the pipe is placed as shown on the drawing there is this noise and the customer is complaining. We tried roofing cement and tar, but this did not help. If we take the angle apart and put hair cloth on the inside will this stop the noise?

C. L. M., Chico, Calif.

Answer for Last Month's Problem

The problem presented by C. L. M., California, dealing with noise in downspouts is one which I have encountered and solved as shown in the sketch.

Care should be taken when fitting



one angle into another to see that all extra metal (see points A-B-C in sketch) do not project into the pipe because these ends act as drips.

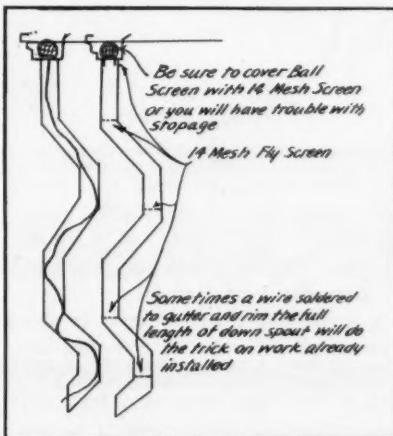
If the rattle is caused by anything besides the dripping of water slowly draining down the inside of the pipe after a rain, I have no solution.

John F. Aingworth,
Cleveland, Ohio.

Answer for Last Month's Problem

The sketches below are sent in by J. C. Wilson of 3816 Beverly Boulevard, Los Angeles, to show his method of eliminating the disturbing noise created by water falling through a downspout.

Two methods are suggested as



shown and each sketch is really self explanatory.

Answer for Last Month's Problem

In regard to the inquiry of C. L. M. on page 44 of A. A. for October, please note that noise in metal leaders is not a new complaint. As long as 29 years ago one of the leading architects of New York City had solved this problem by having cast iron connections made to go over belt courses.

The writer's opinion is that a better practical job can be made, and a better-looking job also, by cutting a chase in the belt course shown along with the inquiry of C. L. M. Of course where it is necessary to offset over a projection like a water table, it is not possible to cut a chase in the wall, nor would it be advisable. At a point like that the noise could be minimized by making a long radius elbow with the outside radius three or four times the projection of the pipe. This would stiffen the metal and in addition to that would cause the water to strike at an obtuse angle, both of which would help to diminish the noise.

H. A. D., New York.

Aluminum Solder

American Artisan:

I would like to know if there is a satisfactory solder for use with aluminum.

V. F., Alabama.

Reply by The Editors

There are and have been a number of so-called aluminum solders placed on the market with some praiseworthy claims advanced for them. However, we understand from the Aluminum Company of America that so far no all-around satisfactory aluminum solder has been developed.

Some aluminum solders which will stand up in mild climates or inside will not stand up under extremes of weather, either hot or cold and joints eventually break. Welding has been recommended for all outside applications.

Reply by Aluminum Co. of America

Our Research Laboratory has recently developed several new solders and soldering fluxes for aluminum and these are now being tested in the laboratory and tried out by a number of manufacturers.

This new soldering material is quite an advance over past solders and fluxes but as yet we are not ready to distribute a general soldering technique for aluminum.

Removing Red Lead

American Artisan:

I would like to ask what is the best method and the easiest way to remove paint where two coats of red lead were applied to galvanized iron. This red lead was applied by mistake and must be removed without injury to the galvanized coating.

H. L., South Bend, Ind.

Reply By The Editors

If this is a surface such as a roof use a regular oil paint or varnish remover applied with a brush and washed off. If the surface is vertical use a cream base paint or varnish remover applied with a brush and washed off. Do not use a water base remover.

Piping a Pipeless

American Artisan:

I have a problem dealing with a pipeless furnace made over into a piped job. The furnace has a 19-inch fire pot. The inner liner is 38 inches, outer casing 48 inches in diameter.

When the furnace was made over it had a bonnet like an inverted cone which flared at the top to a diameter of 48 inches or the diameter of the outer casing. The pipes have a good pitch and are sufficiently large with a good slant to the furnace.

This same furnace when listed by the manufacturer as a piped unit has a 38-inch casing. I have been told that the pipeless casing should be cut down to the 38-inch diameter of the pipeless inner casing or the diameter of the standard piped job. Also that the 48-inch casing is much too large an air passage for a piped furnace.

Is it practical to remove the inner liner and use a casing lining like the ones on a piped job by blocking off the top and bottom of the liner and making the diameter of the liner or baffle whichever it is called, 38 inches?

M. P. B., Colorado.

Reply by The Editors

The effect of casing diameter on capacity and efficiency of furnaces has been tested at the University of Illinois and a report of the tests is contained in Bulletin 141 published by the university.

Briefly these tests show that casing diameter is critical both as to furnace capacity and furnace efficiency.

Too small or too large a casing reduces both capacity and efficiency. These tests also show that for every furnace whether top round or back crescent radiator type there is a definite "best" casing diameter.

Without going into the tests and their results too deeply we can say that small casings increase air velocity through the casing and also raise register air temperatures while larger casings decrease air velocity and lower register air temperature. Capacity is raised to the highest point with just the right casing and is lowered with smaller or larger than correct casing sizes. Furnace efficiency is likewise reported.

These university tests show that best results were obtained when the casing has a ratio of free area to gross area of approximately 0.46 and a ratio of free area to leader area of 1.35.

A table prepared by the university gives a 19-inch grate furnace a favorable casing diameter of 40 inches.

The gross area may be obtained by

dividing the minimum free area by 48 and multiplying by 100. Therefore if the leader pipe area of your furnace is rated 615 square inches (this is the usual manufacturer's rating for a 19-inch pipeless) the gross area will be 615 divided by 48 equals 12.81 times 100 equals 1281.

This gross area of 1281 square inches equals a casing 40 inches in diameter. This compares pretty closely with your 38-inch suggested casing and certainly shows that your 48-inch casing is so large that good operation would be doubtful.

We suggest that the cheapest method to remake the casing is to block the top and bottom leaving inner and outer casings intact. Then block off the top register or remove it. And as a last operation cut the new cold air through both outer and inner casings.

Turning Blades

American Artisan:

I have charts showing the design and application of rectangular blade elbows in large sizes, but I cannot find any similar charts for sizes used in domestic jobs.

I would like turning blades in short elbows in sizes around 8 inches high and 10½ inches wide. If the elbow was 8 feet high and 10½ feet wide the number of blades needed is two; the spacing would be 32 inches; the radius 39½ inches and the lip 24 inches.

Since my elbow is in inches rather than feet I am wondering if I still use two blades can I divide the dimensions for the large elbow by 12 and get the correct spacing. If so I would have radius 3.3 inches; spacing 2.67 inches and lip 2 inches.

F. H. G., Nebraska.

Reply by The Editors

So far as we know there have never been any tables or formulas developed for application of turning blades in elbows of the small size you mention.

Samuel R. Lewis, in his book Air Conditioning for Comfort, shows a chart for turning blade design and application, but this chart is not designed to read for ducts smaller than about 10 by 15 inches. From this chart about the best answer which can be read for the 8 by 10½-inch duct would be 6 blades, radius 1¾ inches, lip 1 inch, spacing 1½ inches.

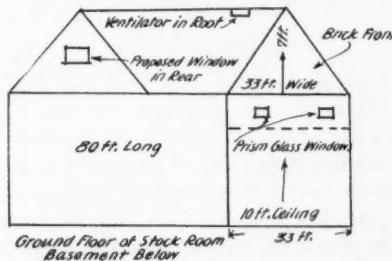
Our opinion is that in any duct these small blades would be useless and the line had better be realigned so a long sweep elbow can be substituted.

Cooling by Ventilation

American Artisan:

We have a one-story, frame building with brick front and one side brick veneer. The building is 33 by 80 feet outside measurement. The ceiling is 10 feet high and there is a space 7 feet high between ceiling and ridge of the roof. The roof is tin.

We want to remove the heated air from the attic space. It is impossible



to cut through the brick front, but we have in mind cutting through the roof near the end and placing a ventilator on the roof as shown on the sketch.

What size ventilator and openings are required? Also will such a system change the temperature in the ground floor? We want to make this first floor cooler.

McN. Bro., Ohio.

Reply by Paul R. Jordan, Indianapolis, Ind.

It will not be necessary for you to make an opening in the south end which you have marked on your drawing as "proposed window." It will be much better for you to make an opening in the ceiling close to the south end and then put a ventilator on the roof as near to the north end as is possible.

The layout will draw air into the north end which will travel the length of the room to the opening in the ceiling at the south end, thence up through the ceiling opening into the attic where it will travel back to the north end and be exhausted through the ventilator. This will give you the maximum of air travel, ventilating your entire store room and at the same time ventilating your attic.

You have 2,640 square feet of roof space to take care of. You will need 211,200 cubic feet of air per hour for roof space or attic ventilation. This can be accomplished with a 36-inch gravity ventilator or with a 20-inch fan ventilator. The fan ventilator would be better, being more positive.

The opening in the ceiling could be either a hatch or register. A hatch would be better. A hatch should be 20 inches square if the fan ventilator is used and at least 36 inches square if the rotary ventilator is used. If this opening is covered with wire it should not be smaller than 2-inch mesh.

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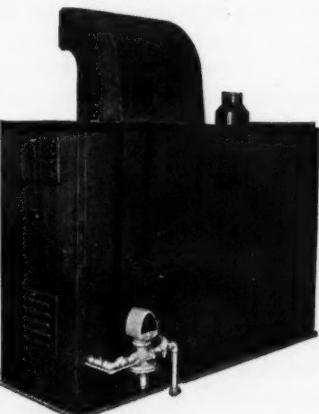
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You can compete to advantage for every warm air heating and air conditioning job that comes up in your community, if you are a Moncrief dealer.

The Moncrief line includes every type and style of furnace and air conditioning system for the home. Nothing better made. Everything priced right.

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GAS FURNACES



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AIR CONDITIONING SYSTEMS

Cleveland, O.
We supply everything used on a warm air job.

ASSOCIATION Activities

Youngstown, Ohio

The Sheet Metal Contractors Association of Youngstown and vicinity meets at 8 P. M. each Friday night at Plumbers' Hall, 219 Lincoln Ave.

At the present time we have about 40 members and usually about a 75 per cent attendance. The officers of the organization are:

G. F. Ockerman, President.
H. E. Owens, Vice-President.
J. J. Dalzell, Secretary.
J. R. Perkins, Treasurer.

Under the leadership of W. L. Leedy, chairman of the Executive Committee, an exhaustive inquiry as to average costs of the various activities of sheet metal contractors is being entered into each meeting night. Members are unanimous in declaring the demonstrations to be of great value to them.

Various bad practices of members as well as jobbers are being discussed and ways and means figured out to reform and combat them. Our members are 100 per cent in support of the NRA and we are willing to do anything in our power to assure its success.

James J. Dalzell,
Secretary.

Hartford, Connecticut

Word has been received from Joseph E. Murray that sheet metal, roofing and warm air heating contractors of Hartford, Conn., are now trying to reorganize and an organization seems assured within a very few weeks.

Canton, Ohio

We have in Canton an organization of 33 furnace and sheet metal contractors representing the leading men in the industry in our city. Since the formation of the association about one year ago our efforts have been directed to matters bettering conditions within the trade.

One of the important activities lately is the drive to get only genuine repair parts used by members of the association. When the question of repair parts came up some time ago we decided that we should be selling and installing genuine parts in place of castings manufactured by parts foun-

dries. A letter was sent to the various furnace manufacturers calling their attention to our effort.

We understand that the manufacturers are now bringing out a general repair parts catalogue which will be ready for general distribution about the first of 1934. We also understand that the prices for these genuine repair parts will be as low or nearly equal to the price of the repair parts specialists.

Canton, Ohio, Feb. 2, 1933.
To the Furnace Manufacturers.
Gentlemen:

At a meeting of The Furnace & Sheet Metal Contractors Association held January 9th, it was decided that this letter be sent to the Furnace Manufacturers who have dealers located in this city for the purpose of obtaining, if possible, a price on repair parts which would enable the members of this Association to use genuine parts in preference to parts now being furnished by the Furnace Repair houses.

We have in Canton, Ohio, a Repair Parts Company who have issued a catalog in plain figures showing the net wholesale price which is equal to 50 and 10 per cent off Kramer Bros. and National Foundry & Furnace Company's list. This catalog has been placed in the hands of people in all lines of trade such as bankers, savings and loan companies, real estate companies, etc.

The furnace dealers of Canton, O., have heretofore enjoyed a fairly good trade from the above mentioned business houses, but it is practically cut off now by the gyp manufacturers.

Now, gentlemen, this is your business as much as it is ours and if this is going on in other cities, as it is no doubt, you are certainly losing business in a branch of the industry which today represents the bulk of the furnace business.

We hope and trust that you will consider this matter carefully and see if arrangements can be made whereby the members of this Association can buy genuine parts through your dealer at a price that will enable us to compete with the gyp manufacturer. Some of the manufacturers have already met the situation and to such we want to assure you that this Association will give its full support.

Our next meeting will be on February 13, 1933, and we would appreciate having your reply by that time.

Very truly yours,
The Executive Committee,
Ralph J. Peters, Secy.,
406 Newton Ave., N. W.

The sale and use of genuine repair parts has increased noticeably since our drive began. A copy of the letter we mailed to manufacturers follows.

Ralph J. Peters,
Secretary.

New York State

The New York State tentative code of fair competition has been mailed to all state members. A few additions and corrections have been made since the first copy was mailed so a revised copy will be sent out shortly.

We are still carrying on an intensive campaign against the manufacturers and jobbers who have maintained sales policies that are harmful to this industry. For example, we have recently persuaded one company to discontinue the practice of selling rain carrying equipment to private owners and to contractors outside our field.

A serious situation is confronting our industry since the advent of conditioned air work. Numerous steamfitters and plumbers realizing the future offered by this type of work are now calling themselves sheet metal contractors and are installing these units.

These individuals have been given the opportunity of affiliating with this association but to date not one of them has taken such action. A close check on this item has been kept so that the above statement is entirely correct.

Unless these steamfitters and plumbers co-operate with us in all respects we will be compelled to purchase air conditioning equipment from those manufacturers who are selling their merchandise only to legitimate and established sheet metal contractors.

For nearly a year we have been cautioning the sheet metal contractors to be on their guard against the steamfitter and plumber encroaching on the air conditioning field. Such a condition has now come to pass.

Letters from all over the state have come into this office protesting the encroachment of the plumber and steamfitter into our business and we are compelled to take the above stated action.

A. Hesse,
Secretary.

Association Activities

Wisconsin State

The Wisconsin State board of directors met at Oshkosh on October 11th to plan for the 1934 annual meeting to be held in February.

Two plans of raising money have been proposed. The first is the sale of advertising space in the yearly publication. The second plan contemplates sale of display space at the convention. It has not been decided which plan we will adopt, but the decision will be made at the November board meeting.

At the October meeting the code was gone over and we now have the backing of every locality and district to put the code into effect.

The Wisconsin act entitled Emergency Promotion of Industrial Recovery has been put into effect. This act follows closely the National Industrial Recovery Act in setting up codes for industries, in establishing the importance of selling above cost, sets up maximum hours of labor and minimum rates of wages. The Wisconsin act goes farther in that it makes state courts guardians of the act and provides assessments against each industry in order to provide the necessary funds to carry out the provisions of the law.

Paul L. Biersach,
Secretary.

Oklahoma City

On August 20th there met in Oklahoma City some 40 sheet metal contractors from over the state who formed an association known as "Association of Sheet Metal & Roofing Contractors of Oklahoma" at which time officers and directors were elected and the body went on record as favoring the adoption of the Sheet Metal Code as proposed and written by the National Association of Sheet Metal Contractors with some possible minor changes which might come up later.

This is all the business that was attended to at that time and adjournment was called with the agreement that another meeting would be called in Oklahoma City or Tulsa at a later date after the National Sheet Metal Code had been adopted or approved at Washington. This meeting when called will be for the main purpose of disposing of the matter of the code permanently. We are advised that this matter will be settled or rather a sheet metal code accepted by the administration by November 1st and our

next state meeting will be held soon after that date.

Our local is working along nicely, meeting every week and anxiously awaiting the adoption of a national code. We have accomplished two things in our local organization in the meantime that the members seem to think will be helpful to them. These are the matter of credit information exchanged among the members and a system of charges made for merchandise sold or loaned by one member shop to another, same merchandise if sold to be charged at a rate of 25 per cent above cost and when material is borrowed to be repaid promptly.

In addition we have prepared a list of materials that each shop has on hand that they would like to dispose of and each member is furnished a copy of the list and when in need of anything so listed attempts to buy it from the one who so lists it.

This gives the shops a chance to dispose of materials which are slow sale as well as merchandise on which he may be overstocked. The matter of price on this merchandise to be a matter strictly between the buyer and seller. We find the biggest asset of our local organization is the good will that prevails among competitor shops when they meet each other face to face at our weekly meetings. Our officers are as follows: Ira Bian, President; G. W. Looney, Vice President; W. A. Conkling, Secretary-Treasurer, and W. O. Moran, Sergeant-at-Arms.

W. A. Conkling,
Secretary.

Fulton County, N. Y.

The sheet metal, warm air heating and roofing contractors of Fulton County, New York, are now organized 100 per cent. We are going into collective buying in car load lots of furnaces, sheet metal and roofing supplies and we have agreed to refuse to buy from any manufacturer who sells to the consumer or to any contractor or firm not a regular warm air heating and sheet metal firm.

Our association plans to hold a banquet on November 11 at 9 P. M. in Foresters Hall, South Main St., Gloversville, N. Y. Vice President H. P. Limmer will be toastmaster. State President Wm. J. Schmitt, Second Vice-President Edward F. Klick of Rochester and State Secretary Adolph Hesse will be present. The Utica association will be present as a body.

D. V. Quackenbush,
President.

Dallas, Texas

During August and September the Dallas Sheet Metal Contractors Association conducted a campaign to increase the membership with the result that October finds us with 38 members, or about 88 per cent of the firms engaged in the sheet metal and heating industry in Dallas.

During October we have directed our energies toward establishing codes of minimum prices for which various kinds of sheet metal and heating jobs can be done in compliance with the government's program under the NRA.

While we are far from reaching perfection in this task, we have made progress and our hope lies in having a specific code for our industry signed by the President of the United States so that we may do away with the well known chiseler.

Business is rather quiet.

A. E. Parker,
Secretary.

Fox River, Ill.

Our association has been passing through an organization period for the past six weeks. We are now well on the way to a completion of that organization in the formulation of a definite future program. A constitution and by-laws have been passed, directors have been elected, books of record have been set up by the secretary and treasurer, and the following committees have been appointed:

A Public Relations Committee, whose duty it will be to bring about more cordial relationships and a better understanding of problems existing between members of our association and manufacturers, representatives, architects, general contractors, public utilities and other trade associations.

There have also been appointed three sectional grievance committees; one for the northern, one for the central and one for the southern section, of the area we cover. It will be the duty of these grievance committees to try and settle misunderstandings between members of our association, between members and their employees, between members and general contractors, etc., in their respective territories.

Failing in this, a misunderstanding will be referred to an arbitration committee consisting of three men, one from each section.

For the present, we are planning to hold two meetings a month, one a strictly business meeting and the other a dinner meeting at which we will have an educational speaker of some kind.

Jack Stowell,
President.

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THE SAVONIUS

"S" ROTOR VENTILATOR and SMOKE COWL

HUNDREDS OF INQUIRIES and numerous sales marked the first announcements of the new S Rotor Ventilator. Dealers and Contractors were quick to recognize its many unusual features.

Consider these features—now. The S Rotor Ventilator is a combination of the famous Savonius S Rotor and a special centrifugal fan. It operates constantly—silently on S K F grease packed bearings in the gentlest winds and is unaffected by heat, cold, rain, sleet, snow or the destructive action of salt air, smoke, gases or fumes. The smoke cowl is always positive in action, increases draught and makes back draughts impossible.

Wherever the rapid evacuation of dead air, smoke, gases, fumes, etc., is of the first importance—in factories, foundries, chemical plants, etc., there will be found a ready market for this superior ventilator.

Architects, Engineers and Residence owners are also real prospects, for the greater suction power of the S Rotor Ventilator in wind velocities of less than two miles per hour makes it the most efficient ventilator available today.

Plenty of new business is obtainable with this ventilator on new construction and in replacing old worn out and inefficient ventilators. In many cases it may be installed in place of a power ventilator at great saving to the purchaser.

Territorial franchise may be still open in your vicinity. Write today for more complete information, prices, etc.

UNITED STATES VENTILATOR AND POWER CORPORATION

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184 SUMMER STREET

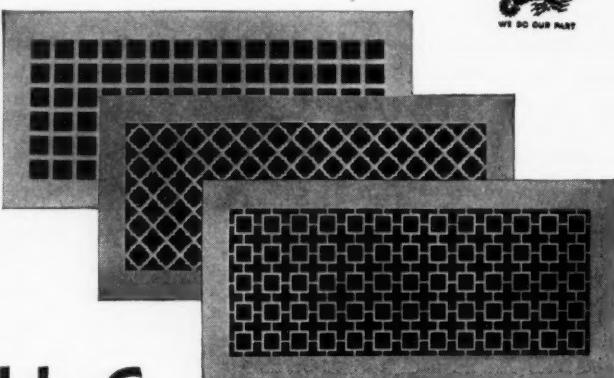
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BOSTON, MASS.

Science and Good Sense Dictate FLAT Type Grilles for FORCED AIR REGISTERS

• note these 7 Definite Advantages

1. The flat grille face may be easily decorated to match or harmonize with the interior, resulting in an extremely inconspicuous installation.
2. A flat grille does not readily collect dust.
3. A flat grille may be easily cleaned or redecorated in place.
4. This type of grille is strong and rigid and not easily dented—an important consideration if the register is located near the floor.
5. A flat grille stamped from heavy gauge steel will not easily rust. Due to the high degree of humidity inherent in air conditioning, this is an essential requirement.
6. This type of grille offers just enough resistance to the air to do two things which are essential to the satisfactory functioning of a forced-air system:
 - (a) The velocity of the air entering the room is reduced to the proper point.
 - (b) The air is diffused over the entire face of the register, causing it to enter the room on a nearly horizontal plane.
7. A flat steel grille does not cause any audible noise, regardless of the velocity of the air.



H & C

Forced-Air Registers are all made of heavy gauge flat steel. The very complete line includes one and three-piece sidewall and baseboard types with return air intakes to match—all available in the three attractive grille designs shown above. New Pocket Catalog, showing the entire line, on request.

HART & COOLEY MFG. CO.

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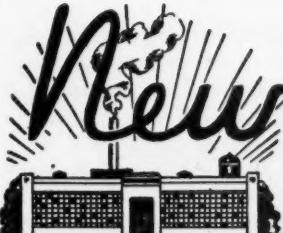


WARM AIR
REGISTERS

GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO

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Philadelphia, 1600 Arch St.

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New Britain, Conn., Corbin Ave.

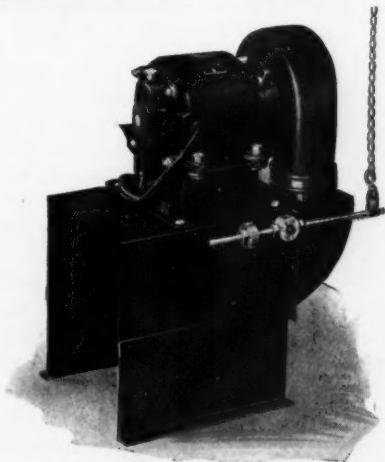


New PRODUCTS

Forced Draft Blower

The Miles Furnace Fan Division of the Henry Furnace and Foundry Co., Cleveland, Ohio, announces a new forced draft blower suitable for application to hot water or steam boilers, but particularly suited to use on large boilers where fuel savings made possible with a cheaper priced coal are desired.

The unit consists of a motor and blower mounted on a pressed steel



base with the base formed as a housing which contains a balancing damper. The unit is attached to the boiler below the grate line and the damper is connected with a pressure valve. The damper yields to the air pressure from the fan from a closed to open position and also yields to a pressure from steam or water from the valve.

These counteracting pressures control the damper, which in turn permits more or less air from the fan to pass into the ash pit section to control the fire.

In tests the unit has shown an ability to control steam pressure within a range of two ounces over an extended period of time.

Complete information on the unit, together with full explanation of the operation and users' testimonials, are contained in a pamphlet which can be obtained from the company.

Tinning and Galvanizing Compound

A new re-tinning and re-galvanizing compound suitable for re-tinning, re-galvanizing, re-leading and re-solder-

ing is announced by the American Solder and Flux Co., Wayne Ave. and Berkley Street, Philadelphia, Penna.

The new compound carries the name Tinol. The manufacturer states that a flushing ingredient which will penetrate most foreign substances, such as grease, paint, rust, is used, and that a highly satisfactory surface for tinning can be obtained.

The compound is also manufactured in powder form for re-coating metal which has been welded and the coating burned away.

Full particulars can be obtained from the company.

New Conditioner

A new domestic air conditioner consisting of a blower-filter and a washer-humidifier combination for installation together or separately is announced by the United States Air Conditioning Corporation, Minneapolis, Minn.

The unit will be marketed under the trade name Balmi-Aire Warm Air Furnace Unit.

The blower-filter unit employs a forward curved blade centrifugal wheel designed for slow and quiet speeds. The motor is furnished with adjustable pulleys for change speeds

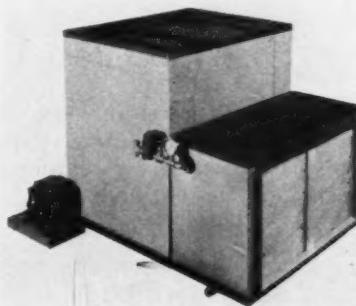
Furnace Fan

A new line of furnace fans in single, double and triple wheels suitable for forced air heating, drying, cooling and air conditioning has been placed on the market by the Buffalo Forge Co., Buffalo, N. Y.

The fans are of the multiblade type, designed to move large volumes of air against pressure, are silent at all speeds. Rubber mounted bearings are obtainable.

The fans have double inlet, have a

and oilless anti-friction bearings are used. The Dustop filters are housed in a tray above the wheel and can be



removed from either end of the cabinet.

The Washer-humidifier unit throws a finely atomized spray into the air stream as the unit is mounted after the fan. A specially designed spun glass eliminator mat prevents any entrained moisture being carried into the furnace casing.

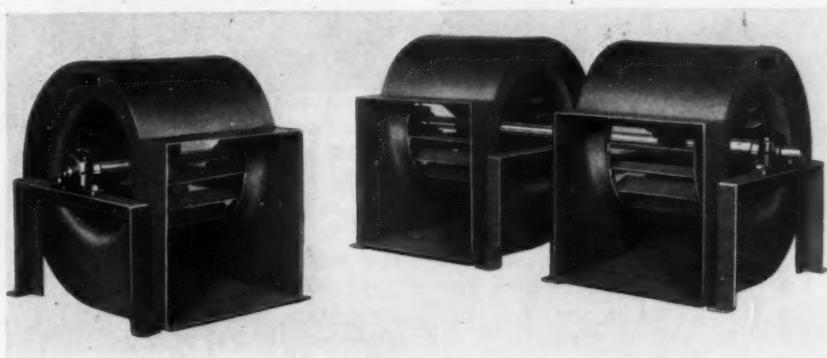
The fan unit is made in four sizes rated from 500 c. f. m. to 7,000 c. f. m.

Full information on sizes, design, connections to furnace, operating data are contained in leaflets which the company will be pleased to send any contractor.

pressed steel, welded housing, with an angle iron frame to carry the wheel bearings. Two styles are available—one with bearing frame a part of the housing and a second with bearings supported on independent legs.

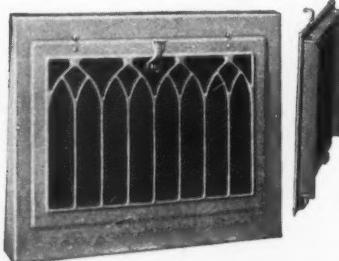
The fans have a range from .835 C.F.M. at 534 RPM to 4,000 C.F.M. for a triple wheel at 484 RPM. The wheels are also designed to operate against resistances up to $\frac{1}{2}$ -inch.

Information can be obtained from the company.



Baseboard Register

Hart and Cooley Manufacturing Co., Chicago, Ill., announces a new baseboard register No. 120 which differs from other H. & C. baseboard registers in that the stack-head over-



laps the register frame, affording the so-called streak-proof construction.

The valve mechanism is identical with that used on the company's line of forced air registers and is claimed to be trouble-proof and efficient.

The face is held to the register frame by means of off-center screws, eliminating the "buttons" used on other H. & C. baseboard registers.

Fifteen different sizes are offered in all finishes.

The new line is shown in the company's Pocket Catalog, just published.

New Russell Products

Russell Electric Co., Chicago, Ill., announces two new products—the "Hold-Heet" stack limit control and an air filter.

The stack limit control is supplied complete with ventilated mounting bracket for stack attachment. The only material exposed to corrosive action is the nickel chromium tube. The unit is calibrated 100 to 650 degrees.

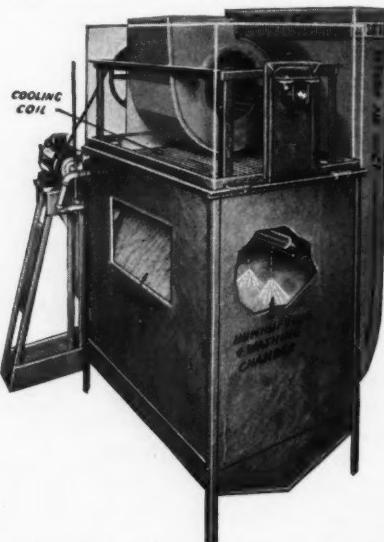
The filters consist of a welded steel frame, self supporting. The filler is a fibrous material treated with an odorless, adhesive coating.



Full information on the two new items is contained in the company's bulletin No. 402.

Filtering and Humidifying Air

The unit which is shown here has been designed and placed on the market for the purpose of properly distributing, filtering and humidifying air introduced by force into a home. The air to be treated flows counterflow to the gases in the heat interchangers section. The air is introduced in the unit and travels over 27 lineal feet of heating surface. Air from the unit is in-



troduced into the room at a height of 6½ feet from the floor. The maker is The Edwards Manufacturing Co., located at Eggleston avenue and Fourth street, Cincinnati, Ohio.

Relay and Thermostat

The Hart Manufacturing Company, Hartford, Conn., announce a new mercury tube relay in two sizes—20 and 30 amperes—and made in single, double, triple, four pole, also single



pole double throw, and double pole double throw units.

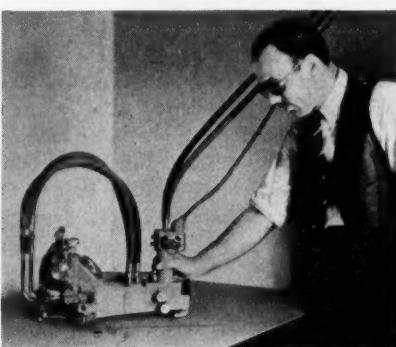
The relays are claimed to be positive in action, silent, fool-proof and able to stand up under constant use for long periods.

The company also announces a direct break thermostat for use as an immersion unit in liquids.

Portable Cutting Machine

A portable cutting machine weighing but 43 lb, has been announced by The Linde Air Products Company, 30 East 42nd Street, New York, as an addition to its Oxfeld line of apparatus. It is known as the Secator.

Combining the portability of a blowpipe with the accuracy and finish



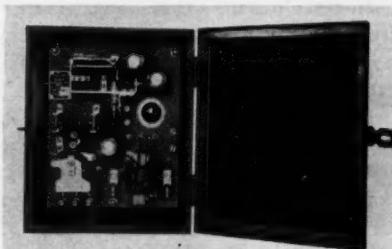
of a cutting machine, the Secator makes it possible to do high-quality cutting anywhere in the shop or in the field. It is adaptable to plate shops, tank builders, steel plants, moderate size metal working plants or any organization that needs a cutting machine which can be brought to the work.

Essentially it consists of an Oxfeld Type C-14-H blowpipe (especially designed for it) mounted on an electrically driven, air-cooled, dust-proof chassis. It is equipped with a direct drive and runs either on a 1½ inch angle-iron track, furnished with it, or on any relatively smooth plate.

Welding Timer

For use in connection with resistance welding machines. The Electric Controller & Mfg. Company, 2690 E. 79th St., announce the EC&M Automatic Weld Timer. This timer does not provide a definite amount of time for each weld, but varies the time automatically in inverse proportion to the rate of current flow to produce a 100 per cent weld at each operation.

When installed and adjusted for the range of work at hand, it is claimed



with this new device that each weld will be perfect and all welds will be uniform regardless of fluctuations in line voltage, condition of electrodes, variations in thickness of material.

News Items

Armco to Make Stainless Steel

The American Rolling Mill Company, Middletown, Ohio, will manufacture and distribute stainless steel sheets, strips, and plates, according to an announcement by W. W. Sebald, Vice-president of the company.

Armco plants have been producing stainless steel sheets, strips and plates for many months for the account of the Rustless Iron Corporation and these products have been used by a number of manufacturers who have cooperated by keeping careful records of the performance under actual production conditions. Performance under the dies has demonstrated unusual ductility and formability, both of which have resulted in lower tool expense.

Armco stainless steels will be offered in two different grades, Armco 17 and Armco 18-8. The 17 grade is used for automobile parts, furnace parts, nitric acid and oil refining equipment and oil burner parts. The well-known 18-8, so popular in modern architecture is widely used for



J. P. Butterfield

airplane parts, baking, laundry and dairy machinery, beer barrels, hotel, restaurant and kitchen equipment, cooking utensils, soda fountains and counters, as well as a large number of other uses.

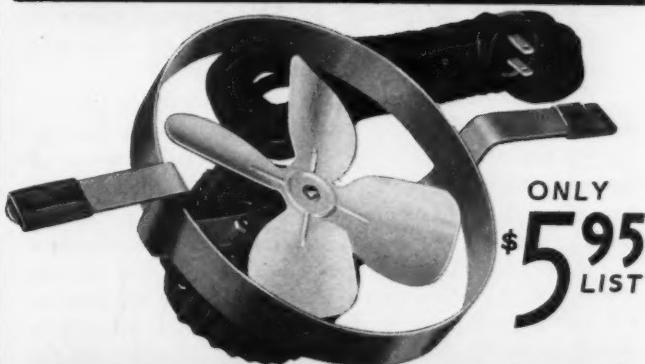
Both production and sales are under the direction of men who have had wide experience with stainless steels. A stainless steel sales department has been created. J. P. Butterfield, formerly manager of the Armco development department, is in charge. He will be assisted by E. E. Jones. Production in the different plants is under the supervision of Ralph E. Curry and W. L. Woodward, both of whom are assistants to the vice-president in charge of operations. Sales will be handled through Armco's district offices in New York, Philadelphia, Detroit, San Francisco, St. Louis, Seattle, Chicago, Boston, Milwaukee, Pittsburgh and Middletown. Jobbers are being appointed in several cities.

New Cleveland Shop

The American Sheet Metal Company has been established at 2083 West 26th Street, Cleveland, Ohio, by J. J. Gebura and Lee Drosch.

The new firm will do industrial and domestic sheet metal work and warm air heating.

More Customers! Greater Profits! AN "ALL SEASON" SELLER



ONLY
\$5.95
LIST

VICTOR HEAT BOOSTER

"I have a room that's hard to heat!" How often have you heard these words? Our guess is that you can name a dozen such complainers without even stopping to think. But listen! Start thinking right now of all the homes you know that have "hard to heat rooms." Everyone is a ripe prospect for the Victor Booster and, when they hear they can solve this serious problem with this new low-priced unit, you'll make a sale—a good profit—and another satisfied customer.

Now Is The Time!

Right now—when cleaning and repairing jobs are few and far between—is when you can keep your profits up by pushing the Victor Heat Booster. It's simple to sell—a five-minute demonstration convinces the toughest skeptic. Let it perform right in their own home—let it bring loads of cozy, cheering warmth into the room that is cold as ice. Watch their amazement and admiration. Then, tell them that they can have such comfort all winter long—in any kind of weather—and it means reduced fuel bills because they'll never have to "over-fire" the furnace again.

Easy To Install

A few moments is all it takes to install the Victor Heat Booster. Its rugged, heat-proof motor is guaranteed to give dependable service. Here's a product that will sell fast and show you some handsome profits this winter, so act now—get your share of this "easy money"—mail the coupon below for samples today!

ORDER YOUR SAMPLES NOW

VICTOR ELECTRIC PRODUCTS, INC.
701 READING ROAD, CINCINNATI, OHIO

Gentlemen: We want to try your Heat Boosters so kindly ship us one each of both floor and wall type models.

Name _____

Address _____

Name of Jobber _____

NOTE: Dealer discount on Victor Heat Boosters is 25% from list.
Direct purchases accepted on C. O. D. basis.

MAIL YOUR ORDER TODAY!

News Items

Guy Voorhees Becomes Lakeside Engineer

Lakeside Company, Hermansville, Michigan, manufacturers of Furblo, Fairweather, and other air conditioning equipment, announces the appointment of Guy A. Voorhees as head of its Engineering Department. Mr. Voorhees will locate permanently at the Company's offices in Hermansville, and will have entire charge of the company's engineering and development work.

G. A. Voorhees is recognized as an authority on the subject of air conditioning and mechanical warm air heating. He has appeared personally before a very large number of audiences interested in this industry, and his articles, which have appeared in American Artisan since 1930 have been read by almost every heating contractor and manufacturer in the country. He has made a life work of and concentrated almost exclusively on mechanical warm air heating. He has the ability of mixing sufficient practicability with theory to enable him to pose as a real authority on the subject.

Reviewing the company's shipments for the past three months, July of this year shows an increase of 3½ times over July 1932; August shipments amounted to twice as much as the same month last year; and September almost twice. I. W. Rowell, manager of Lakeside Company, in reviewing this very satisfactory increase in business, attributes it to two causes: first, it indicates a slow but sure improvement in business conditions throughout the country; and second, a very largely increasing interest in air conditioning, particularly winter air conditioning.

Heating and Ventilating Exposition

Judging by the taking of space, the Third International Heating and Ventilating Exposition scheduled for Grand Central Palace, New York, February 5th to 9th, 1934, is now well along with its program and layout. Contracts for space at this date indicate an exposition not only extensive in scope of exhibits, and number of exhibitors, but well balanced with regard to its major industrial sections.

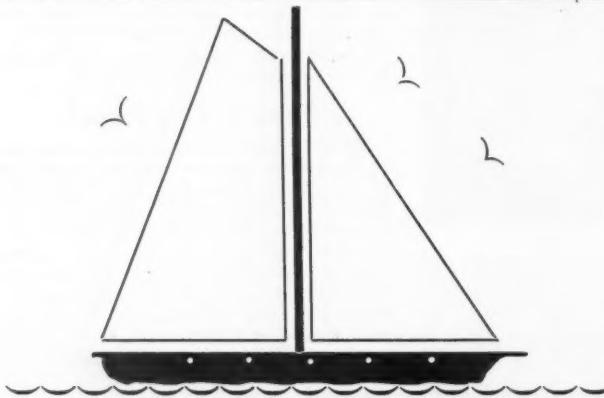
In heating, ventilating, and air-conditioning fields, there is now the most active interest, not only from the standpoint of public building projects, but also industrial and office buildings, and homes. The inclination to purchase is more active, and the means to purchase are more available in line with the general attitude of restored confidence.

New Toncan Distributor

Stratton & Terstegge Company, 15th and Main Sts., Louisville, Ky., have been appointed distributors of Toncan Copper Molybdenum Iron sheets, it was announced recently by N. J. Clarke, Vice-President in Charge of Sales, Republic Steel Corporation, Youngstown, Ohio. The new distributors will carry a complete warehouse stock of Toncan Iron sheets for the Louisville territory.

W. E. Donnelly Opens Shop

W. E. Donnelly, formerly associated with the Donnelly Tinners, has engaged in the sheet metal and furnace business and opened his own shop at 13228 Madison Ave., Cleveland. Mr. Donnelly has a well appointed show room, office and shop.



clear sailing ahead!

MEET THE NEW DEMAND FOR QUALITY WITH
HUSSEY SHEET COPPER & COPPER PRODUCTS

H U S S E Y

As business conditions improve the demand for quality becomes more and more pronounced. No longer is it a question of "how much"; it has become a question of "how good." To the sheet metal contractor this means that, unless he is equipped to install or fabricate a quality product, he is going to lose a large portion of this profitable business which would otherwise find its way into his shop.

Where the demand is for quality in sheet metal materials, Hussey Sheet Copper and Copper Products will meet the demand every time. Today, just as it has done for the past eighty-five years, the Hussey organization

is devoting its facilities to the production of only the highest grade materials. During these years of service, Hussey has always been a principal source of supply for progressive sheet metal contractors. Established at vantage points about the country, Hussey warehouse stocks are always available to these men on short notice.

There is clear sailing ahead for sheet metal contractors who are prepared to meet today's quality requirements. To meet these requirements choose Hussey Sheet Copper and Copper Products. Your orders will receive prompt attention.

C. G. HUSSEY & COMPANY
PITTSBURGH, PENNSYLVANIA

*District Sales Offices—BALTIMORE....CINCINNATI....NEW YORK....BUFFALO....CLEVELAND....PHILADELPHIA....CHICAGO....ST. LOUIS....PITTSBURGH.
Warehouses—CHICAGO....NEW YORK....PHILADELPHIA....CINCINNATI....CLEVELAND....PITTSBURGH....ST. LOUIS.*

*Mills and Executive Office
PITTSBURGH*

News Items

National Warm Air Meeting

Preparations are being completed for the December Convention of the National Warm Air Heating & Air Conditioning Association which is to be held in the Netherland Plaza Hotel, Cincinnati, Ohio, December 5th and 6th. A meeting of the Association's Board of Directors and various standing committees will occupy the preceding day.

This meeting will furnish much necessary information relative to the NRA and how it will affect the Industry, also furnish a report to date for the well known Research Activity which the Association has carried on for 15 years in cooperation with the University of Illinois.

There is to be something interesting relative to air conditioning and the merchandising and commercial sides of the business.

The program will include a unique entertainment the evening of December 5th at which Cincinnati will be the host.

There is also to be a special meeting of manufacturers.

A reduction of railroad fares has been granted for one and one-third for round trip on the identification certificate plan.

Cork Insulation Moves

Cork Insulation Co. have moved to new offices in the Commerce Building, 155 East 44th St., New York City.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST, 24, 1912,

Of AMERICAN ARTISAN, published monthly at Chicago, Ill., for October 1, 1933.

State of Illinois, County of Cook—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared D. J. Hansen, who, having been duly sworn according to law, deposes and says that he is the manager of the AMERICAN ARTISAN and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Engineering Publications, Inc., Chicago, Ill.; Editor, F. P. Keeney, Chicago, Ill.; Managing Editor, J. D. Wilder, Chicago, Ill.; Business Manager, D. J. Hansen, Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Engineering Publications, Inc., 1900 Prairie Ave., Chicago, Ill.; Stockholders, F. P. Keeney, Chicago; O. T. Carson, Chicago; E. D. Winslow, New York City; R. Herlov, Chicago; C. L. Davis, Chicago; E. G. Hutchison, Chicago; R. Payne Wettstein, Pittsburgh, Pa.; W. J. Osborn, Fairfield, Conn.; D. M. Kenney, Chicago; D. J. Hansen, Chicago.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

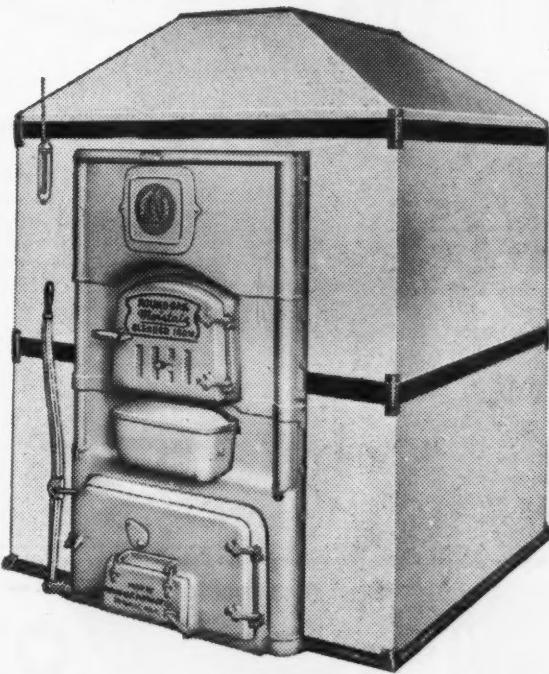
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information required from daily publications only.)

D. J. Hansen, Business Manager.

Sworn to and subscribed before me this 4th day of October, 1934.
(Seal) L. M. Dixon.
(My commission expires September 14, 1934.)

YOU'LL PROFIT Selling ROUND OAK FURNACES



MOISTAIR BLENDED-IRON

**The Standard of Comparison
among Quality Furnaces**

**Selling the accepted standard is the sure
way back to sanity and profits in your Furnace business.**

Remember

Your business recovery depends on you!

**Write Today for catalog describ-
ing our complete furnace line**



ROUND OAK FURNACE CO.

Dowagiac

Michigan

November, 1933

**GET YOUR SHARE
OF THE
REMODELING
AND
REPLACEMENT
BUSINESS!**

» » » » **T**HE greater bulk of the contractors' business this winter, according to present indications, will consist of remodeling and replacement work. Homeowners have discovered in many instances, that old, worn-out heating systems and sheet metal work may be replaced for little more than repairs would cost them. It's a BIG

market . . . go after it while it's at its peak. But be sure you are properly equipped to do the work. Make sure your Viking Shear accompanies you on every job.

VIKING SHEAR CO.
ERIE, PA.

The
VIKING
Shear

"BB"
The mark of quality
on sheet metal and
roofers' supplies

BERGER BROTHERS CO.
229-237 ARCH STREET, PHILADELPHIA, PA.

EAVES TROUGH
GUTTER HANGERS
CONDUCTOR PIPE
CONDUCTOR FASTENERS
MITRES
END PIECES AND CAPS
CONDUCTOR HEADS
ORNAMENTAL STRAPS
VENTILATORS, ETC.



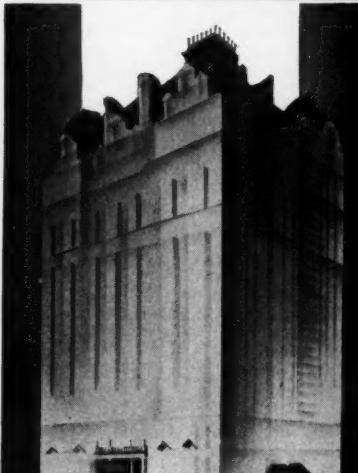
**A More Practical
Tapping Tube**

THE new Central Tapping tube, shown here assembled with Central tap, has a valuable feature. No longer is it necessary to strike the tube off-center when driving it in. The Central tube provides a heavy mallet boss for this purpose which keeps the blow in line with the tube and prolongs the life of the cock.

Write for Catalog C, which shows the complete Central line of Beer Faucets, Water Faucets, Taps and other high quality Bar Fittings.

CENTRAL BRASS MFG. CO.
2953 East 55th St., Cleveland, O.

CENTRAL
•Quality Fittings•



truly
The
Bellevue Stratford

is a home-in-Philadelphia . . . not only for those who enjoy residence here the year 'round but as well for the many who return to the Bellevue again and again. In the heart of the business and financial district, only a few minutes from the best in concerts, plays, football—the Bellevue-Stratford combines accessibility with quiet luxury. . . . May we offer you Bellevue-Stratford hospitality? . . . at 1933 low prices of course.

CLAUDE H. BENNETT, General Manager.

PHILADELPHIA

News Items

New Inland Sales Office

The Inland Steel Company, Chicago, has opened a sales office at 1511 Kirby Building, Dallas, Texas. This office will have charge of sales in the state of Texas (with the exception of the city of El Paso) and in the city of Shreveport, La. F. B. McKinney will be district sales manager and in charge of the office.

New Screw and Bolt Gage

To allow the quick and accurate selection of the proper Rawlplug for any given wood screw or lag screw, the Rawlplug Company, Inc., 98 Lafayette St., New York City, has just developed a gage which, upon inserting a wood or lag screw between the jaws or slots, will instantly show what size Rawlplug should be used, and vice versa.

It is made of heavy polished, anti-corrosive steel six inches long by one and five-eighths inches wide, which allows it to fit into the pocket or a kit.

One face shows all standard wood and lag screw sizes and the corresponding sizes of Rawlplugs. It is also calibrated in fractions of an inch to determine bolt sizes from $\frac{1}{8}$ inch to $\frac{3}{4}$ inch, can also be used as a caliper on corresponding sizes of round bars.

One edge forms a six-inch rule, graduated by sixteenth inches, and the other forms a five-inch rule with a slot which permits the accurate measurement of countersunk head screws.

Any reader writing on their business letterhead and mentioning this paper will receive one free of charge, providing they will send ten cents in stamps to cover mailing charges.

Wilmington, Del., Firm Moves

The Dependable Supply Co., Wilmington, Delaware, have recently moved into their new building at Third and French Streets. The company will have facilities for carrying a complete wholesale line of furnace, sheet metal and roofing supplies.

T. S. Silberman is in charge.

American Blower Expands

Establishment of a new appliance accessory department to care for the company's increasing business in multi-blade wheels for oil-burners, dryers, air conditioning units and other accessories has just been announced by the American Blower Corporation, through H. E. Barth, general sales manager.

The corporation has for a number of years furnished other manufacturers with multi-blade wheels and other fan and blower accessories.

The new department, according to Mr. Barth, offers a large number of combinations and types of multi-blade wheels for immediate delivery. Enlarged manufacturing facilities make possible quantity production at low prices.

Labor Advisor Appointed

Announcement is made by the National Recovery Administration that the labor advisor for hearings on the code for the warm air furnace manufacturing industry is Harry Stevenson of the Molders Union.



Every inch . . . it's a perfect heating unit

• THE VEROIS Furnace, from the top of its radiator down to the base ring, is a perfect heating unit. Every feature, each detail of construction, are contributing factors in the efficient and economical operation of the VEROIS Furnace. Take, for example, the VEROIS Radiator, which is cast in one piece with smoke and clean-out collars cast on. The large and heavy reinforced combustion chamber makes for best combustion. The two-piece fire pot is corrugated with lock cup joints. Mounted on steel ball bearings, the duplex, basket type, grate affords ease of handling. The slip-on feature of the upper and lower fronts means a snug fit over and around the feed and ash pit sections. No inside joints to permit admission of dust, gas or dirt into the warm air chamber. Each VEROIS Furnace is completely assembled before leaving the factory and for this reason it may be easily set up on the job.

Equipped with the VEROIS Furnace, you can sell your customers the heating *perfection* and heating *satisfaction* which they are seeking these days. Let the VEROIS Furnace help build a reputation for you . . . get the complete VEROIS story today.

MT. VERNON FURNACE & MFG. CO.
MT. VERNON ILLINOIS

Manufacturers also of enameled circulating heaters for coal, gas, wood and oil; coal, wood and oil ranges; enameled gas ranges.

Vernois
FURNACE

370 "SPECIAL"
and SHEET METAL ROOFS

LOOK down upon the roofs in your community. Single out those roofs that are sheet metal and then make it your business to do the painting job.

And keep this in mind—*sheet metal roofs must be painted regularly in order that they continue to protect the buildings they cover.* Sheet metal roof painting is business that is constant and profitable.

With the fact that roofs must be painted regularly already established, the question that is important to you is, which paint to use, to do the job most satisfactorily and economically.

We suggest 370 "SPECIAL RED." Here is a paint, the ingredients of which, assure long life and protection and which is being recognized among buyers as an exclusive standard where quality is essential but where economy is stressed.

Other Thompson Products—Alumbrite—the new Aluminum Paint for Wood and Steel and Lin-O-Jap, the Perfect Reducing Oil for All Paint.

THOMPSON & COMPANY
P. O. Box 557, N. S. PITTSBURGH, PA.

H ESS
AIR CONDITIONING FURNACE
WELDED STEEL FURNACE
BENEFACCTOR FURNACE
CENTRIFUGAL BLOWER
BLOWER FILTER UNIT
AIR CONDITIONER
FILBLO FURNACE

**FOR MOST QUALITY
AT LEAST PRICE.**

**DEALERS—SELL THE
MOST SALABLE LINE.**

**WRITE TODAY
FOR HESS DEALER PORTFOLIO.**

HESS WARMING & VENTILATING CO.
1201-11 S. WESTERN AVE., CHICAGO, ILL.
MEMBER N.R.A. ESTABLISHED OVER 50 YEARS.

News Items

Home Owners Loan Corp Report

The Home Owners' Loan Corporation announced that 2,451 impending foreclosures on urban home properties to a total value of \$6,991,006.00 were prevented as a result of its activities during the week ending Oct. 6, according to field reports mailed from state and branch offices nationally on that date.

This brings the total number of foreclosures avoided from the beginning of the corporation's activity to 17,957, with dollar volume of \$48,753,061.00. It was also announced that the state and branch offices of the corporation had during the week tentatively approved 7,129 individual applications for urban home loans from the corporation to a total volume of \$18,795,272.00. The total number of individual loan applications tentatively approved nationally up to Oct. 6 was 63,816, totaling \$179,880,468.00.

This dollar volume is 12.6 per cent higher than the total of tentative approvals up to Sept. 30.

A total of 1,148 loans with a dollar volume of \$3,250,097.00, had been completely paid out up to Oct. 6, and the respective transactions closed on the corporation's books. The number of loans closed during the week was 357, amounting to \$996,465.00, an increase of 45.9 per cent over the number of individual loans paid out from the beginning of the corporation's activities to Sept. 30.

In addition to the 17,957 foreclosures averted up to that date, applications for mortgage loans numbering 1,080, with dollar volume of \$3,167,459.00, were withdrawn after being filed, it was announced. Withdrawn applications represent those cases in which the corporation, through its local offices, has assisted home owners successfully to negotiate extensions of existing mortgages or in refinancing these mortgages outside the corporation. The number withdrawn during the week ending Oct. 6, was 348, an increase of 66.5 per cent over those withdrawn the previous week.

A statement by the corporation emphasized that the extent to which home owners are helped in this manner is considered second in importance only to the actual loans of the corporation itself.

Up to Oct. 6 the total number of loans dealt with in this group was 3,776.

Loans tentatively approved to date without reduction of mortgage indebtedness rose from a total of 54,091 on September 30 to a total of 60,042 on October 6, representing an increase of 11 per cent. The aggregate dollar volume in this class to October 6 is \$169,593,861.

Up to October 6 a total of 14,111 applications were rejected by the local offices of the corporation. This amounts to 22.1 per cent of the applications tentatively approved.

Among those rejected, 11,002, or 78 per cent of rejections, were ineligible under the terms of the Home Owners' Loan Act, and 3,109, or 22 per cent, were ruled ineligible after appraisals had been made by agents of the corporation.

Out of the total of 1,148 loans closed to October 6, 1,113, or 97 per cent were consummated by exchange of existing mortgages for Home Owners' Loan Corporation 4 per cent bonds, while only 35, or 3 per cent of all loans closed, represented cash loans. Of the cash loans 14 were for the payment of taxes or for necessary maintenance on unencumbered property, and 21 represented cash loans to mortgagors for the payment of mortgages of less than 40 per cent of the appraised value of the properties.

News Items

Laist Elected President of Copper & Brass Ass'n

Frederick Laist, vice-president of the Anaconda Copper Mining Company, was elected president of the Copper & Brass Research Association at its thirteenth annual meeting held at the Bankers Club. Mr. Laist succeeds the late R. L. Agassiz, former president of the association from the time of its formation in 1921 until his death this summer.

Vice-presidents elected were: F. S. Chase, president of the Chase Brass & Copper Company; C. D. Dallas, president of Revere Copper and Brass Incorporated; H. Donn Keresey, president of the Anaconda Wire & Cable Company; Louis S. Cates, president of Phelps Dodge Corporation.

New Norfolk Shop

J. F. Lagana and G. A. Howell recently formed a partnership and opened a sheet metal and roofing shop at 111 East Princess Anne Road, Norfolk, Virginia.

Frank Mills Joins MW

Motor Wheel Corporation, announces the appointment of Frank Mills as Sales Manager for the heater division of the company. Mr. Mills, who assumed his new duties on October 1, has been an important figure in the oil burner industry for over eighteen years. For the past three years he has been with Preferred Utilities Co. of New York and previous to this connection he spent twelve years with the Wayne Oil Burner Corporation of Fort Wayne, Indiana. While with Wayne he served at various times as assistant treasurer, service manager and sales manager.

Other changes in MW Heater Division personnel include the appointment of George Phillips, former MW service engineer in the East, as service manager, and Earl Egeler as advertising manager for the division. A. E. Nussdorfer, former service manager, is now in the MW Engineering Laboratories, while former sales promotion and advertising manager R. E. Mulvogue has resigned from MW to re-enter advertising agency work.

Organize Filter Sales Co.

H. J. Somers, Inc., Detroit, announces that they have allotted the sales of the Somers "Hair Glass" air filter to the Somers Air Filter Sales Co. of 7310 Woodward Ave., Detroit. This latter company has been formed with the purpose of securing a wider distribution of this filter. Men connected with the sales company are J. E. Randall, formerly general sales engineer for Young Bros. Company, and E. C. Herrington, formerly sales engineer in the Chicago district. Both men have had wide experience in the industrial heating and ventilating field.

McIlvaine Distributors

George H. Blood, 68 River Street, Marlboro, Massachusetts, has been appointed McIlvaine distributor for the territory including the cities Marlboro, Hudson, Bolton, Stow, Berlin, Clinton, Lancaster, Sterling, Northboro, Westboro, Southboro, Sudbury, Wayland, Weston, Natick, Framingham, Ashland, Hopkinton and Holliston.

Buerkel and Company, Inc., 18 Union Park Street, Boston, are the new McIlvaine distributors for Metropolitan Boston and the North Shore district.

The Utilities Distributing Corporation, 79 Sabin Street, Providence, McIlvaine distributors for Rhode Island, have appointed as dealers, John W. Meiklejohn and Sons, Broad and Weybosset Streets, Providence.



PERFORATED SHEET METALS

A LUMINUM, Brass, Bronze, Copper, Steel, Zinc, Tin, Monel, etc. For Ventilators, Grills, Filters, Drainers, Screens, Strainers, Grain Sizing and Grading, Machine and Belt Guards, Conveyor Lining, Galvanizing Baskets, Drying Machinery and Coffee Roasters. Our 50 years' experience is your assurance of satisfaction. Send us your inquiries and let us quote on your requirements!

ERDLE PERFORATING CO., Rochester, N. Y.

ERDLE

WHITNEY LEVER PUNCHES

No. 4B PUNCH



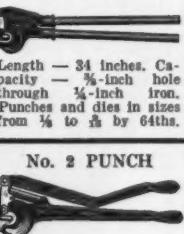
Length—8½ inches. Capacity $\frac{1}{4}$ -inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies— $\frac{1}{8}$ " to $\frac{1}{2}$ " by 64ths.

No. 91 PUNCH



Capacity — $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. 1-inch hole through $\frac{3}{8}$ -inch and 2-inch hole through $\frac{1}{2}$ -inch iron. Depth throat 5-inches. Weight — 82 lbs.

No. 1 PUNCH



Length — 34 inches. Capacity — $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. Punches and dies in sizes from $\frac{1}{8}$ to $\frac{1}{2}$ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. Punches and dies in sizes $\frac{1}{8}$ -inch to $\frac{1}{2}$ -inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron.

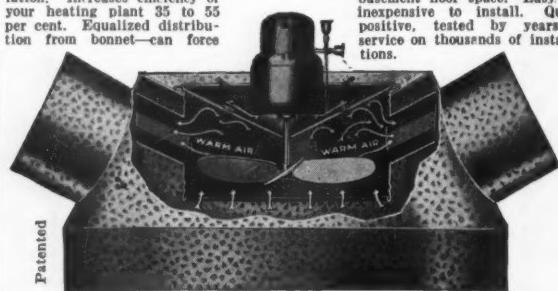
We have tools for every purpose needed by Sheet Metal Contractors.
Ask your Jobber

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

MONEY MAKING AIR HANDLING APPLIANCES!
The New ROBINSON HEAT DISTRIBUTOR

Still the most scientifically correct unit for providing mechanical circulation. Increases efficiency of your heating plant 35 to 55 per cent. Equalized distribution from bonnet-can force

or favor any pipe. Especially adapted where filters are used. Takes up no basement floor space. Easy and inexpensive to install. Quiet, positive, tested by years of service on thousands of installations.



ROBINSON HEATING & VENTILATING CORPORATION, MASSILLON, O.
"Manufacturers of Warm Air Heating, Ventilating and Air Conditioning Equipment"

**The
 AKRON Air Blast FURNACE
 •
 The
 SOLID COMFORT FURNACE**



• The MAY-FIEBEGER Company, Newark, Ohio •



**The
 ALLEN
 MULTI
 VANE
 TURBINE
 VENTILATOR**

Exclusive inner Multi-Vane construction assures unparalleled results.

**THE ALLEN
 CORPORATION
 1036 14th Street
 DETROIT, MICH.**

**BEER
 FAUCETS**
 for
 immediate delivery

THE GLOBE BRASS MFG. CO.
 2925 E. 55th St. CLEVELAND, OHIO

News Items

"Comfort" Not "Heating"

The term "heating" will pass out of use before long in referring to comfortable indoor atmosphere, Elliott Harrington, air conditioning engineer of the General Electric Company, said in addressing the October meeting of the power group of the New York section of the American Institute of Electrical Engineers.

In the conditioned residence of Mr. Harrington it has been found that more than one-third of the heat gain in the summer can be eliminated through attic ventilation and awnings, and that in the rooms a temperature differential as high as 18 degrees existed between floor and ceiling. The mean temperature when a person was standing was consequently different from the mean temperature met with when seated. When the temperature at the breathing line was 70, children playing on the floor were in a temperature of 62.

"With forced circulation of conditioned air," said Mr. Harrington, "it is very simple to reduce this differential to only two or three degrees, thus promoting comfort and probably reducing the tendency to contract colds. It was also found that the summer conditioned air, which is cooler than the room air, was best handled by delivering it across the ceiling and allowing it to fall gently to the floor, where it was removed for recirculation. The winter conditioned air was best handled by delivering it along the floor, from whence it tends to rise, and be taken off at the ceiling."

"In general," said Mr. Harrington, "the operating cost of summer air conditioning in a typical home does not exceed the operating cost of winter air conditioning, in climates similar to that of New York City. In many cases the summer conditioning cost will be lower than that for winter.

"It is believed that the time is not far away when home owners will cease to use the word 'heating.' They will require for installation in their homes an air conditioner which will provide, the year around, the best air conditioning for comfort and health at relatively low cost."

All-year air conditioning, he asserted, will probably never cost more than double the ordinary winter heating cost, and usually will cost less than this.

Air Conditioning Recruit

W. W. Watson, formerly engineer of the comfort cooling bureau conducted by the Detroit Ice Publicity Association, has recently become associated with Tom Brown and associates, manufacturers' agents of air conditioning equipment. Tom Brown has been active in the air conditioning field for some years, representing manufacturers of humidifying equipment, indicators, recorders and humidity controls in addition to such companies as Supreme Humidifier, Vacu-Draft Corporation, Air Conditioning Equipment Corporation, Midwest Ventilating Company and others.

Welding Wrought Iron

A new booklet "Welding of Genuine Wrought Iron," dealing specifically with information of primary interest to the welder, fabricator and designing engineer has been prepared by the A. M. Byers Co., Pittsburgh, Penn., for distribution to anyone interested in the problems of welding wrought iron.

The booklet discusses welding procedure, explains gas and electric methods, gives characteristics of wrought iron pipe. While the booklet deals primarily with pipe welding there is considerable of general interest to welders.

New Literature . . .

Detroit Lubricator Leaflets

Three new leaflets—one describing controls for stokers; the second, combination valve and switch; the third, temperature control switches—have been prepared by Detroit Lubricator Co., Detroit, Mich.

The stoker control leaflet shows and describes thermostats, limit controls, hold-fire controls, low water controls, relay transformers, motor units. Each unit is shown in an illustration and accompanying text tells all about the construction and operation. List prices are shown.

Contractors can get copies of either or all the leaflets by addressing the Detroit Company.

Welding Aluminum

A new booklet—The Welding of Aluminum—has been prepared by Aluminum Company of America and will be mailed to any firm or contractor interested in proper welding practices.

In sequence the booklet takes up fusion welding in step by step discussion and explains welding apparatus, proper flame adjustment, use of flux, choice of welding wire, how to prepare aluminum for welding, supporting the work, effects of expansion and contraction, torch manipulation, strength of welds, welding alloy sheets, electric arc welding, electrodes, arc characteristics, use of jigs, electrode manipulation.

A second section discusses resistance welding in similar detail.

The booklet is thoroughly illustrated by sketches, charts, tables and other material which makes the book useful and practical. The information presented makes the booklet an excellent elementary handbook on aluminum welding.

The company has also published a companion booklet—The Riveting of Aluminum. The general makeup follows that of the welding book with chapters devoted to joints, joint proportions, rivet driving procedure, etc. This booklet also contains many tables, charts and tabular information.

Electric Welders

The National Electric Welding Machines Co., Bay City, Mich., has published catalogue No. 7 describing their line of spot, line, flash and projection welders.

The company's products are shown with all important details emphasized and full tables of sizes, types, KVA ratings and descriptions of the unit.

A copy of the booklet can be obtained from the company.

Duronze No. 2

Bridgeport Brass Co., Bridgeport, Conn., have issued a catalog called Duronze describing the company's three types of high strength silicon bronzes—Duronze 1, 2, 3.

Duronze No. 2 is said to be an alloy with all the good qualities of mild steel plus the corrosion resistance of silicon bronze. Castings are said to be stronger than standard alloys. The metal is hot rolled like copper and can be obtained as either a hot rolled or a cold rolled sheet.

Some suggested applications for this tough material are boilers, tanks, skylight framing, flashings, large gutters, flues, housings subject to corrosive fumes.

Complete information on the material can be obtained by writing for the booklet.

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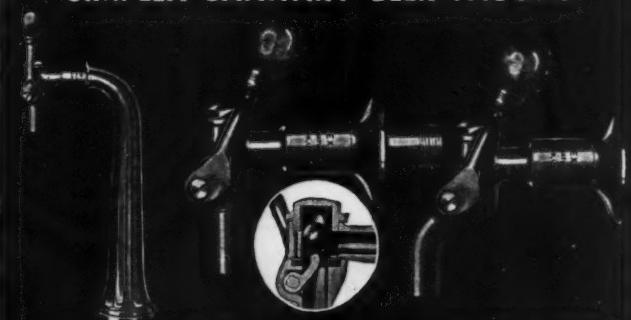
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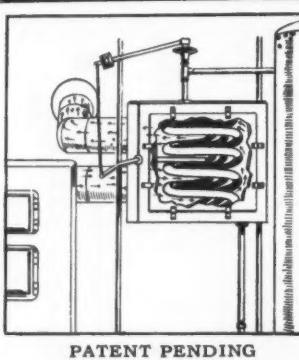
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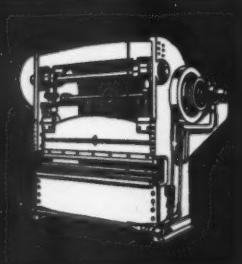
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New Literature . . .

Humidifying Apparatus Leaflets

The Columbus Humidifier Company, Columbus, Ohio, have brought out two pieces of literature—one describes the company's automatic furnace bonnet type pan humidifier and the second gives information on the winter air conditioner.

The furnace type humidifier leaflet describes the well known unit introduced by the Columbus company several years ago. Its well known features of non-clogging valve, cast iron pan and float chamber, heavy copper float are presented in such a manner that any contractor or home owner can understand the presentation.

The air conditioner leaflet shows exterior and cut away views of the unit; while the text explains the conditions brought about by cleaning, humidifying, circulating the air. For those who haven't read about the unit it can be said that one of the interesting features is a gas burner and control system so that the moisture is generated by heat to insure positive and adequate humidity.

Full description is contained in the leaflet. Copies of either or both leaflets will be mailed to readers.

Aluminum Foil Insulation

A small leaflet prepared by the Reynolds Metals Co., 19 Rector St., New York City, describes the company's aluminum foil which is used as insulation and is claimed to possess the insulating value of .72 inches of rock wool, .8 inch of insulation board, 12 inches of brick.

The aluminum foil is .0095 inch thick.

The foil is cemented to both sides of a heavy, tough craft paper supplied in rolls. The company also supplies sheet aluminum cemented to both sides of a tough craft paper.

The material is designed to be applied between or against framing members and when so applied the material reflects radiated heat from the direction it faces and retards it from the opposite direction.

The leaflet will be mailed to any interested contractor.

Butt and Spot Welders

The Micro Products Co., Peoria, Ill., have a new loose leaf catalog of their welding equipment which contractors can get by writing the company.

Included in the catalog are illustrations and descriptions of the butt welders, flash welder, hydromatic flash-welder, micro-weld butt welders, special welders for copper,

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OPPORTUNITY: WE NEED FIRST class salesmen and manufacturers' agents to represent us on the sale of Only Original Soot Destroyer and Boiler-Aid in all open territory. Attractive proposition to the right men. Saginaw Salt Products Co., Saginaw, Mich.

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Manufacturers' Agents or Sales Engineers with forced air heating and air conditioning experience to handle a definite territory on commission basis on a line of equipment which is showing increased sales. Repeat orders indicating customer satisfaction. Give complete experiences and references in first letter. Address Key 247 "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

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WANTED—A SHEET METAL AND roofing estimator. Must be thoroughly experienced in all branches of the trade and a good salesman. Compensation will be based on a share of the profits basis. Address Key 248, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED TO BUY

WANTED TO BUY: EIGHT NEW 20-C Sunbeam furnaces. Write United Boiler Sheet Metal Company, 4909 Homan Avenue, Hammond, Indiana. Phone Hammond 316.

WANTED—GOOD SECOND-HAND THIRTY- inch bar folder. Give best price and condition. Address E. E. Walty, Box 145, Colchester, Illinois.

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SITUATION WANTED: SHEET METAL plumbing and heating man wants steady job. Can go to work at once. A-1 references. L. C. Hughes, Brett, Iowa.

WANTED TO HEAR FROM SOMEONE who can use a radiator repairman and acetylene welder. Can also do tin work. Will go anywhere. Married and steady worker. Address Key 258, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—SHEET METAL man with several years' experience in building furnace fans and air washers. Would like to connect up with a good furnace concern or sheet metal manufacturing company. Address Key 249, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—BY ALL around sheet metal worker. Have had twenty years' experience at the trade. Can estimate layout and erect most any job that comes in the average shop. Can also read blue prints and am experienced in hot air and air conditioning work. Am also an expert oxyacetylene welder on all metals. Job must be steady the year around. Address Key 251, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—HAVE HAD 28 years' experience as tinner and plumber. Am qualified to do repairing and work in the following lines: auto radiator repairing, putting up steel ceilings, pump and windmill repairing, steam and hot water work, installing radios, and any kind of a mechanical job that comes in a shop. Can give good references. Address F. C. Blewett, Boscobel, Wis.

SITUATION WANTED—LIVE WIRE successful sales engineer and production manager. 25 years' experience in exhaust fans, dust collecting, ventilating systems, pneumatic conveying, grain handling, general sheet metal work, production planning, cost cutting, etc. American, energetic, temperate, dependable and well equipped to obtain maximum results by modern methods. Address Key 250, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE

FOR SALE: AUTO RADIATOR AND welding shop in one of the best Arkansas towns of 8,000 population. Address Key 256, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

FOR SALE: ONE 30" SQUARING SHEAR; one 30" forming rolls; one 48" forming rolls; one 30" bar folder, all at a bargain. Address Key 257, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

FOR SALE: IN WISCONSIN CITY OF 4,000, first class sheet metal and heating shop. Price right. Rent reasonable. Address Key 254, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

FOR SALE: ONE 10 FT AND TWO 8 FT. brakes, 18 gauge capacity; One 4 ft. power roller and one 30" squaring shears. Address Key 255, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

FOR SALE: COMPLETE SHEET METAL, plumbing, roofing and pump shop tools. Will sell tools on inventory, or shop and good will in good location, North Central Ohio. Address Key 252, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

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WANTED: PARTY TO HELP FINANCE and manufacture new and different warm air register. Address Key 253, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

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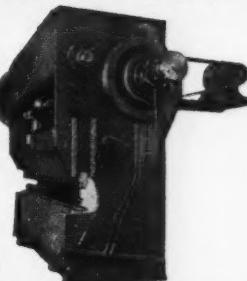
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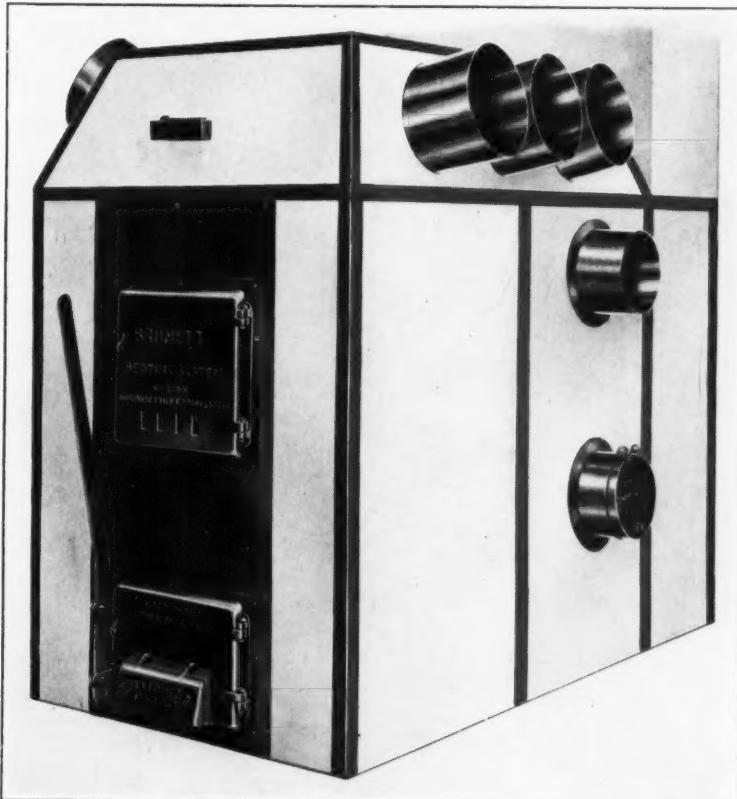
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